

The Iron Age

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A Review of the Hardware, Iron and Metal Trades.

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Four-Thousand-Ton Hydraulic Forging Press.

It has been increasingly evident for some years past that the large forgings required by modern engineers and artillerymen demand something better than the steam hammer for their manufacture. The requirements

of installation of such large hammers has perhaps deterred English steel-makers from making much advance, and, besides this, they have felt that the hydraulic press was more suitable for the production of large forgings. Except in two instances the efforts made to substitute the press have met with only very partial success, owing to its

tion is less in proportion to the weight of forgings made. The moderate height of a press permits the use of overhead traveling cranes, so that the furnaces, six or eight in number (all accessible to the cranes), can be arranged along the sides of the forge with one press to serve them all; whereas four furnaces with a swing crane to each are the

The forging press shown is now being constructed by Messrs. Davy Bros., of Sheffield, England, for Messrs. Charles Cammell & Co., Limited, Sheffield, to the designs of Mr. Charles Davy, who has patented it in all the European States and in America. In this press there are two main pressure rams 36 inches in diameter, 9 feet 3 inches

feet 4 inches in the other. The moving cross-head or tool-holder is T-shaped, inverted, guided at the ends of the arms by slide-blocks bored to fit the columns, and at the upper end of the shank by a bored guide which is securely bolted to the entablature. The arms are connected to the guide-blocks by simple ball-and-socket

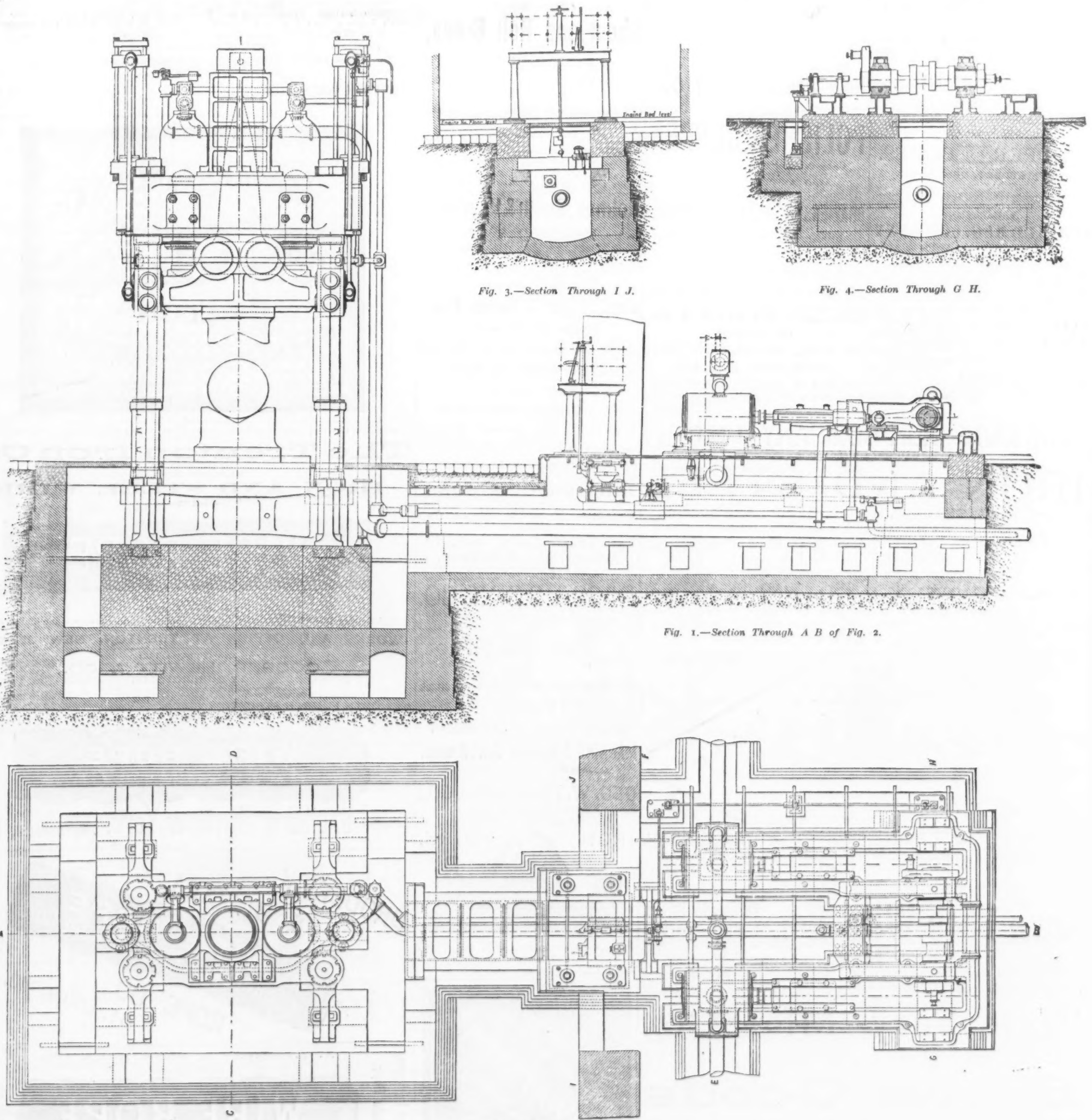


Fig. 3.—Section Through I J.

Fig. 4.—Section Through G H.

Fig. 1.—Section Through A B of Fig. 2.

Fig. 2.—Plan.

FOUR-THOUSAND-TON HYDRAULIC FORGING PRESS FOR LARGE STEEL INGOTS.

in this direction have advanced more rapidly than the means of production, and in only a few instances have manufacturers erected steam hammers of sufficient size to deal with steel ingots weighing upward of 50 tons. Among these are notably Messrs. Schneider, who have a 100-ton hammer; the St. Chamond Works, an 80-ton; Woolwich possesses a 40-ton; and Krupp, a 60-ton at work, and a 150-ton hammer now, we believe, in course of erection. The great cost

slowness of action and want of adaptability to the variety of work which can be executed under a hammer. Seeing that the press has been proved to make the best forgings, further efforts are now being made, and there will shortly be three presses put to work in England.

The question of the quality of work, of course, outweighs every other consideration, but there are other reasons for the transition now in progress. The cost of installa-

practical limit in the case of a large hammer whose great height forbids the use of overhead travelers. It is less costly to keep in working order; less liable to breakdowns; while in the one of which we present engravings on this page and on page 7, at least the supposed inherent slowness of action has been overcome, and it possesses all the handiness and adaptability of a steam hammer. For the illustrations and particulars we are indebted to Engineering.

apart, and two lifting rams 9 inches in diameter, all 7 feet stroke, the ram cases for which are carried by a massive entablature built up of two main girders 5 feet deep and two shorter cross girders. A similar, but heavier, set of girders forms the base-plate, to which the entablature is secured by four wrought-steel bolts or columns 20 inches in diameter, the clear height between the girders being 21 feet, and the centers of the columns being 15 feet in one direction by 6

joints, in which a slight amount of play is allowed in order to accommodate the expansion that occurs when the crosshead becomes heated by proximity to a hot forging. For the same reason it is obviously impossible to connect the main rams rigidly to the crosshead, and therefore long spherical ended thrust-rods are interposed between it and the rams. It will be seen that the horizontal

Continued on page 7.)

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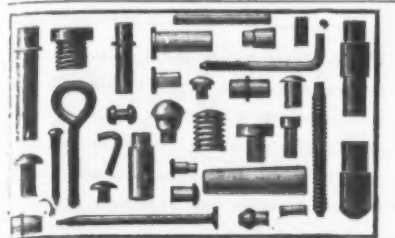


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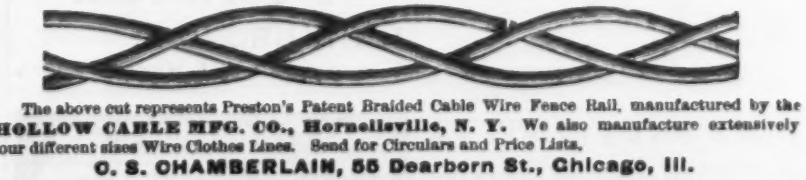
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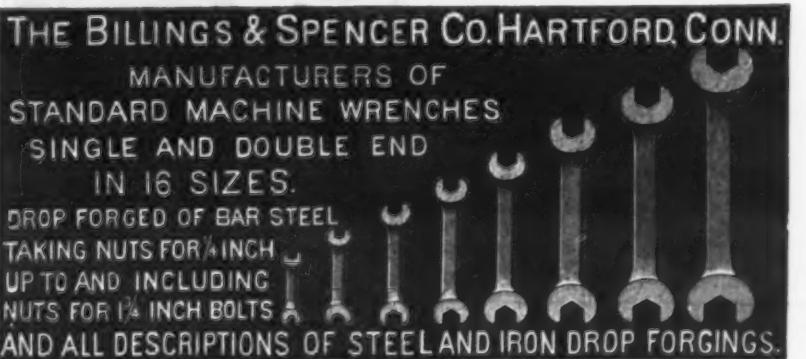
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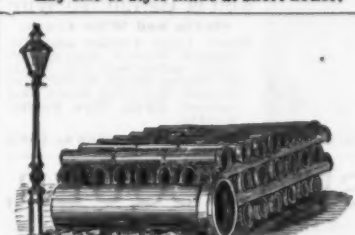
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In case of war with foreign powers we should be forced to the rapid construction of temporary fortifications behind earthen parapets. One of the great difficulties in the way of such construction is the time required for building properly the heavy, massive masonry foundations up to this day regarded as necessary under heavy guns. This difficulty may be now avoided (according to Capt. W. H. Bixby, Corps of Engineers, U. S. Army) by the use of wrought iron instead of masonry for these foundations. Captain Bixby proposes to replace the present slowly built, difficultly moved, difficultly leveled masonry foundations for heavy guns behind earthen parapets by rapidly constructed, easily moved, easily leveled wrought-iron foundations, to rest on cross-girders or sleepers embedded in the earth of the *terre-plein*, and provided with a front parapet anchorage sufficient to resist all direct recoil.

The holding power of anchorages embedded in mere earth is well known by the experiments of the Q. M. Department on suspension-bridge anchorages during the war 1861-65, and it is also well shown by the Shoeburyness experiments referred to in Captain Bixby's report on "Seacoast Fortifications in Europe." A 40 foot earthen parapet and suitable iron rod and cross-girder anchorage may well be trusted to resist and absorb all the direct horizontal recoil of even a 100-ton gun, leaving to the foundation alone the lighter duty of supporting the carriage and gun and the comparatively small vertical component of the recoil.

An iron girder foundation resting on sleepers and earthen bed may be fairly well trusted to serve as an efficient support to the vertical weights and blows of our heavy guns after the first few rounds have been fired. A little unequal settlement may naturally be expected, but such settlement is of minor account to-day, for two reasons: First, heavy guns of the present and future must be traversed by machinery, and such machinery will overpower the slight extra resistances due to unequal settlement of the gun's platform. Second, whenever an unequal settlement becomes marked and objectionable (probably not often more than once in a month during action) the iron girder foundation can be jacked up and earth tamped in underneath it (exactly as is currently done to remedy similar unequal settlements of railroad tracks). It seems now quite probable that future fortification in the United States (when it does come) will demand economy of time rather than economy of money. In any case the advantages which may arise from rapidity of original construction, rapidity of construction in place, facility of repair, facility of change of position if necessary to allow of other angles of fire, facility of replacement if necessary to allow of guns of greater weight and size—all these advantages appear sufficient to authorize at least the trial of such a foundation under one of the heaviest guns. Captain Bixby's suggestions are now being considered by the War Department, and will probably lead to some change in the present slow methods of gun-foundation construction.

So important is the forestry question becoming in this country that every step taken toward gaining information about the developments in tree life should be most favorably regarded. The National Department of Agriculture, in its Forestry Division, has decided upon a general system of observation throughout the country, and asks the aid of all in the undertaking. Every one who will apply will receive blanks which, when filled out, can be used by the department to formulate general statements regarding tree growth. The period of vegetation of different species (time from appearance of first leaf to general change of foliage), the relative time for planting different species, and the capability of the species for acclimation, are among the facts sought for under this system and expected to be acquired if hearty co-operation is awarded the department by individual citizens of the different sections.

The mining owners of Ostrau have decided to offer a prize of 1000 ducats for the best invention for preventing accidents in firing and blasting in dusty or gaseous coal mines, or rendering the operation harmless. The invention should fulfill the following conditions, namely: 1. Its use, effects or explosion should not cause the coal dust to ignite. 2. It should not produce after the explosion or use more injurious gas than through the methods heretofore employed. 3. No specially difficult, dangerous long preliminary arrangements or complicated apparatus should be required in using, setting up, loading, transporting or lighting. 4. Should not by its use and result be much more expensive than the former blasting methods. Applications should be sent before the end of 1886 to the K. K. Bergbaupolymannschaft, at Vienna.

A curious phenomenon in the combustion of copper and nitrogen has been observed by M. Blondlot and communicated to the French Academy of Sciences. A disk of platinum and a disk of copper 0.03 meter in diameter were fixed vertically in front of each other by means of two platinum stands. The disks were 3 or 4 mm. apart, and both were placed inside a bell jar of porcelain open below. The apparatus was then heated red hot for three hours by means of a gas furnace, and although there was no electric current it was found that the face of the platinum disk was blackened with a deposit containing copper and platinum. In short, the copper had crossed from the copper to the platinum plate.

The Imperial Russian Technical Society is making preparations for a petroleum exhibition, to be held at St. Petersburg, which will not only show the condition of the native petroleum industry, but also enable foreign countries to exhibit the appliances for manufacturing oils, &c., from the raw product, and employing them for purposes of illumination.

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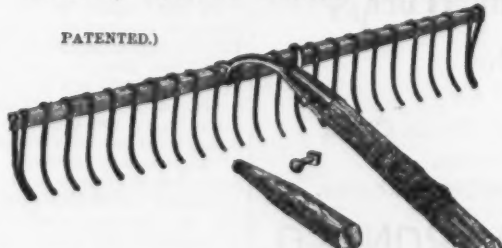
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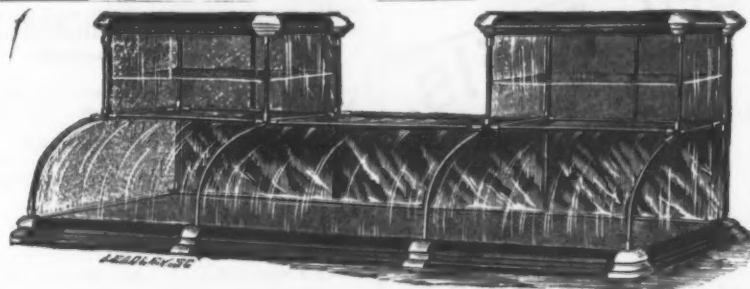
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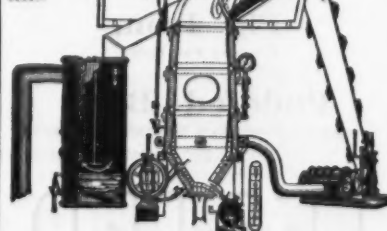
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sett, Black & Co., of Crooke City, Mont., a 15-ton and
a 30-ton furnace; Wright & Homans, of Rapid City,
Dakota, a 5-ton furnace. Several others are now
awaiting a test of their ores before placing their
orders.

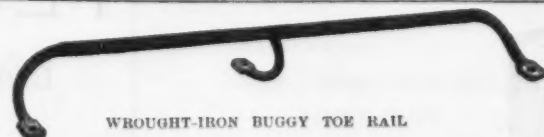
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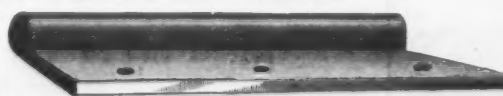
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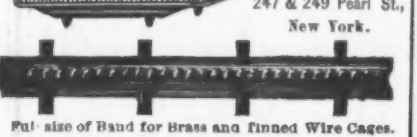
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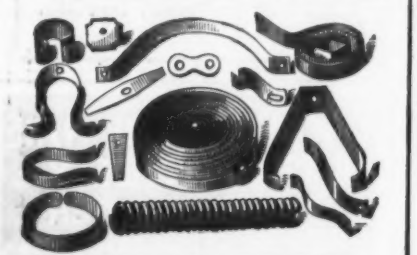
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Fig. 120.



Fig. 365.

Fig. 203.



Fig. 70.

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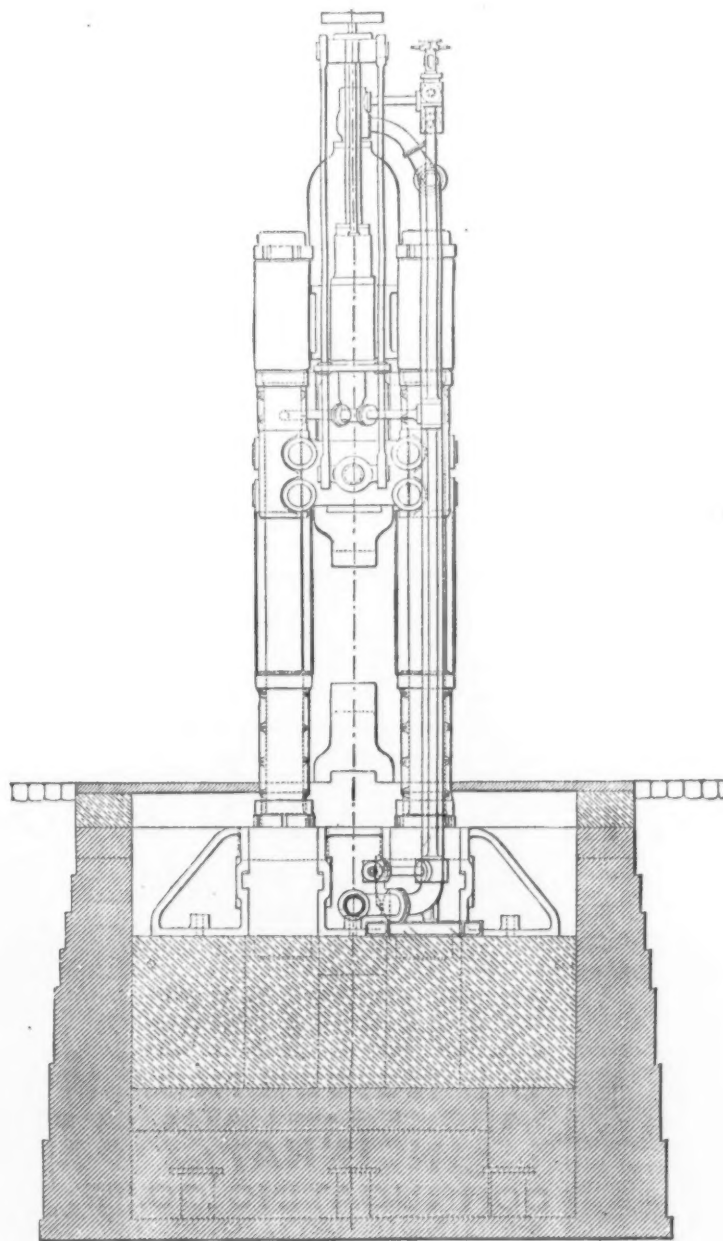
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IRON LEVELS.**

(Continued from page 1.)

position of the crosshead is maintained en-
tirely by the columns and the shank guide,
and as the lateral pressure on the rams is
therefore scarcely appreciable, it is to be
expected that these important parts and
their packing leathers will be very durable.
The system adopted by Mr. Davy of guiding
the crosshead independently of the pressing
rams admits of a forging being placed con-
siderably out of the mid-position between
the two rams without danger of grooving
them.The substitution of two pressing rams for
the single one previously used in forgingareas of the pressing and lifting rams being
as 16 to 1.The pumps may be run at almost any
speed up to 60 or more revolutions per
minute, so that the pressing and return
strokes are made with considerable velocity.
Though the pressing stroke is made so
rapidly under the action of the pumps, it is
not nearly quick enough to take up the
clearance that must be allowed between the
upper tool and the forging when it is de-
sired to turn it (the forging) into a new po-
sition. Supposing a plain round shaft to be
under the press, the tool must be lifted after
each operation some 6 inches at least above
the forging to allow it to be turned. This

Four-Thousand-Ton Hydraulic Forging Press.—Fig. 5.—Section Through C D.

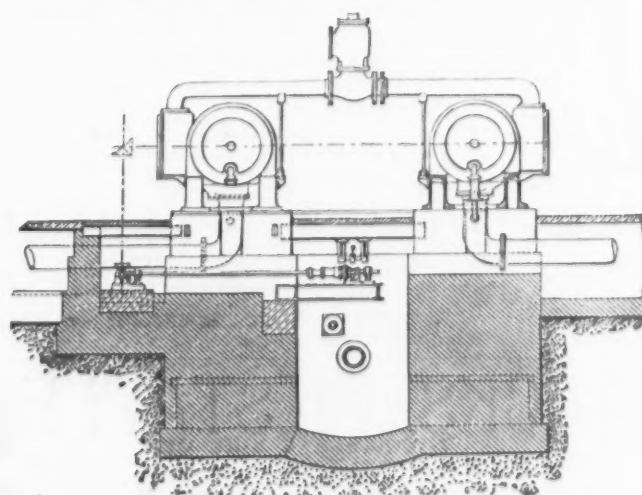
presses possesses other good features be-
sides enhancing the utility and safety of the
press. The main girders of the entablature
are comparatively light castings, weighing
about 25 tons each, the distance from the cen-
ter of the columns to the center of the rams
being only 2 feet 10 1/2 inches. The principle
also admits of the extreme width across the
entablature being reduced to the smallest
possible limit, thus enabling the sling chain
sustaining the forging to be brought within
quite a short distance from the anvil if
requisite. Hydraulic power is supplied by a
set of three single-acting ram pumps 6
inches in diameter and 12-inch stroke, drivenclearance is taken up at the rate of about 2
feet per second by putting the main ram
cases in direct communication, through large
valves, with the low-pressure service.Without describing in detail the arrange-
ment of the valves and the high and low
pressure pipes, shown clearly on the draw-
ings, the action of the press will be readily
understood. Assuming the crosshead to be
raised some inches above the forging, the
outlet of the lifting ram cases is first opened.
The pressing ram cases being at that time
open to the low-pressure service, the cross-
head descends rapidly until the tool rests
upon the forging. The pumps are now

Fig. 6.—Section Through E F.

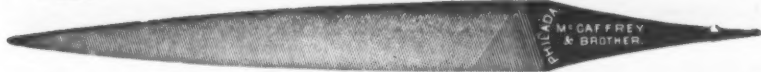
from the crank-shaft of a pair of steam
engines having 34-inch cylinders. As they
are supplied with water from an independ-
ent source at a pressure of 60 pounds per
inch, very small suction-valves are required,
with corresponding advantages in respect to
leakage, clearance and renewals. The
chief use for the low-pressure service of
water, however, is in connection with the
press itself, where it is used to promote the
rapidity of action so much desired, and to
prevent the infiltration of air into the ram
cases and pipes. The hydraulic pressure
varies from 4500 pounds to the inch down-
ward, and is dependent on the resistance of
the forging to compression. The capacity
of the pumps is such that at each revolution
the crosshead is depressed 1/2 inch, but it is
lifted 3 inches per revolution, the relativestarted; the large valves on the pressing
ram cases automatically shut off the com-
munication with the low-pressure service
and open it to the high pressure. As soon
as the required compression has been effected
the crosshead rises again in readiness for
another stroke. Only two levers are re-
quired for controlling the three motions, one
for the press itself and one to start the
pumps.As a consequence of the method of work-
ing it follows that, whatever may be the
thickness of a forging, the position of the
crosshead is adjusted to it automatically.
Its handiness approaches that of a steam
hammer, inasmuch as a forging of rectan-
gular section can be pressed alternately on
the flat and on the edge; and, further, there
is no irksome necessity to place the forging

Paris, 1878.

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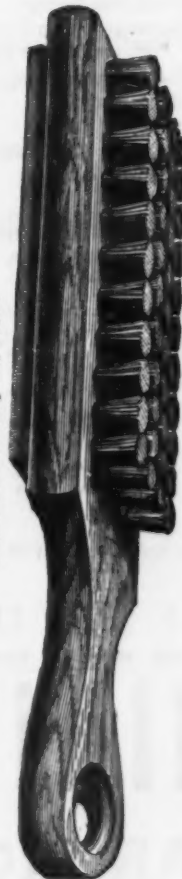
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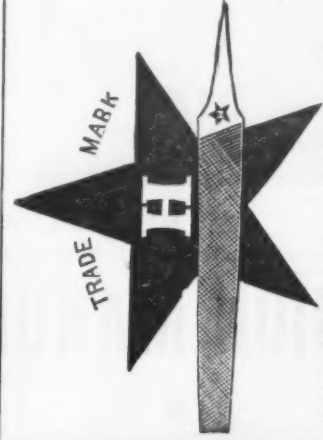
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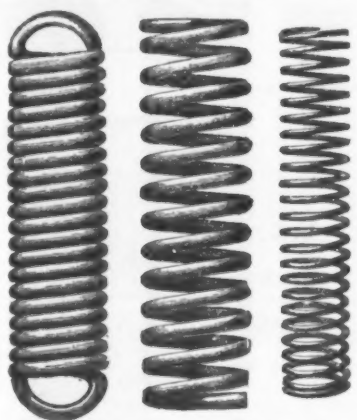
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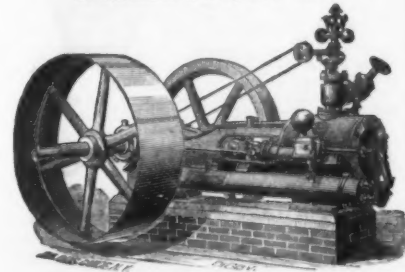
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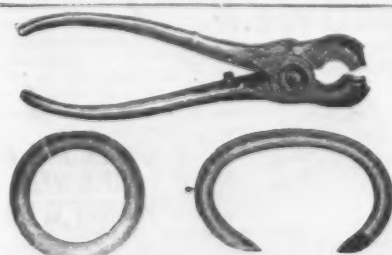
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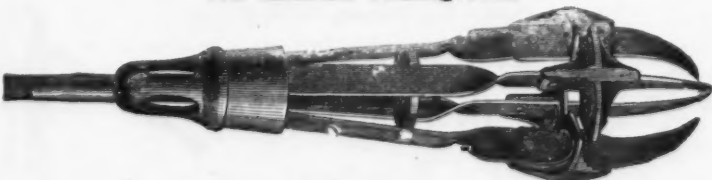
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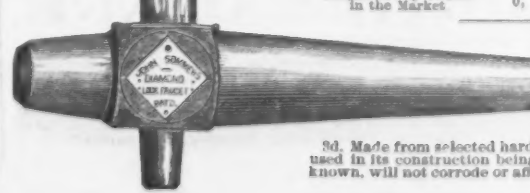
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picked, will not leak, and keeps
light.

2d. A Faucet that can be driven
and will not split, as it has a solid
head, its working parts being on
the top.

3d. Made from selected hard rock maple polished, all metal parts
used in its construction being pure black tin, which, as commonly
known, will not corrode or affect any kind of liquid.

exactly under the center of stress. The
forge erected by Messrs. Cammell consists
of a brick building containing a center bay
260 feet long by 60 feet wide, with two side
bays to cover the furnaces. The press occu-
pies a central position therein, and the fur-
naces are arranged along either side. Two
overhead travelers (of 150 and 110 tons)
command all the furnaces and the press, all
of which have been supplied by Messrs.
Davy Brothers, Limited, Sheffield. The
entablature girders, the base plate girders
and the crosshead are steel castings; the
ram cases and the columns are wrought
steel.

English Letter.

(From Our Regular Correspondent.)

LONDON, May 10, 1886.

THE WEEK

has not been very notable in the iron and
steel trades proper, but in some of the hard-
ware, cutlery and electro-plate branches,
there has been a good deal more business
transacted. This augmentation of activity
is undoubtedly owing in a great measure to
the opening of the Colonial and Indian Ex-
hibition by the Queen, and the performance
of a similar ceremony on behalf of the Inter-
national Exhibition, at Edinburgh, by Prince
Albert Victor, the eldest son of the Prince
of Wales, and the future King of England.
The Maritime, &c., Exhibition, at Liver-
pool (colloquially termed "the Shippers")
will be opened by the Queen to-morrow,
May 11, and the function will be the occa-
sion of much local festivity. The Colonial
and Indian Exhibition was visited by about
140,000 visitors last week (in five days, in-
cluding the select few who only were ad-
mitted to witness the opening ceremony),
and over 40,000 persons were present on
the opening day at Edinburgh. Both these
exhibitions were almost completed in all
respects when they were thrown open, but
I hear from Liverpool that the arrange-
ments there are far from being perfect,
and that the enormous aggregation of
exhibits will be very imperfectly dis-
played during the present week. This is not
surprising when it is remembered that the
buildings were not put in hand until Sep-
tember last, and that portions have twice
been blown down by gales of wind. Of
these three big shows that at Liverpool will
be found to be the largest in respect of ma-
chinery, plant and heavy work, that at
Edinburgh the most varied and the Colonial
one in London the most instructive. The
last-named is bringing large numbers of
wealthy colonists, Indian rajahs, and so on,
to London, and some of them are already
buying very freely. This will be of dis-
tinct benefit to the trade of the country,
and will, it is believed, do much in the way
of establishing closer relations between
colonial and Indian buyers and British
manufacturers. The latter are certainly
looking after some of the colonial traders
who are over very keenly. In one case I
heard the other day of nearly 30 travelers
(drummers) waylaying such a gentleman in
his own office in the hope of securing his
favors.

Great attention has been excited in this
country by the very full reports (promoted
no doubt by the low cabling rates just now
in vogue) published by the newspapers of
your eight-hour troubles at Chicago, Mil-
waukee, &c. You will find the subject
alluded to more or less intelligently in many
of the British newspapers which reach you
currently with this letter. The general im-
pression seems to be that these disputes will
help British trade with the United States,
and that if the eight-hour movement is at
all successful its incidence may be of real
utility in furthering our trading relations
with you. Speaking of labor troubles re-
minds me that the *Ironmonger* (London)
publishes letters from the John Cockerill Co.,
of Seraing, and Mons. Paul Trasenster, of
the Liège School of Mines, on the subject of
the recent labor riots in Belgium. Both
letters allege that the newspaper reports of
the disturbances were greatly exaggerated,
that there is no probability of further riots
and that, although wages are comparatively
low in Belgium, they are free from violent
fluctuations, and give a purchasing power to
the recipients which bears very favorable com-
parison with the wages of other countries.
Elsewhere I give you the principal features
of the British Board of Trade returns for
April. These figures are interesting, but
they do not show the remarkable expansion
(comparatively speaking) of the shipments
to the United States. I have looked over
the returns with care, and I am struck by the
fact that there is scarcely a single item in all
the voluminous classification which does not
show a great increase in the exports to the
United States. In many items, such as pig
iron, tin plates, steel and scrap iron, the in-
creases are of special interest to your read-
ers, but in cloth piece goods, textiles gen-
erally and all other articles there are figures
which demonstrate a very marked develop-
ment of our trade with you, as compared
with the figures for the same month of 1885.

THE IRON MARKET

has continued extremely dull, without a
rally of any kind. Inquiries for pig iron
have fallen off compared with a few weeks
ago, and the markets generally have de-
clined. The returns for April issued by the
Cleveland Ironmasters' Association show a
diminution of make upon the previous month,
but that is accounted for by the damping
down which followed the refusal of many of
the blast-furnace men to accept the terms
offered by the operators. Allowing for this,
the returns exhibit a no more satisfactory
condition than before, as stocks are still on
the increase and shipments below the aver-
age. In Scotland there has been a further
shuffling of the cards as to furnaces in and
out of blast, but the furnaces put in blast
are mostly for special brands which do not
affect the general market. The Glasgow
warrant market has been steady, closing at
38/3. In Cleveland 29/9 has ruled for No.
3, and on the West Coast 42/ continues for
mixed parcels. In neither district have
either inquiries or transactions been numer-
ous or large, while most of them have been
for prompt delivery. In Staffordshire late

rates prevail with a condition that has now
ruled for so long. In galvanized sheets,
wire and finished iron no change worth men-
tion is to be recorded, although, perhaps, in
the finished departments things have been a
shade better. It is significant that bars
which changed hands in 1873 at £16 were
quoted at Wolverhampton on Wednesday at
£7, the 10/ reduction initiated by Hingley
& Sons having now become general. Old
iron is fairly steady at late rates, viz., old
double-headed iron rails, 50/ @ 52/6; old
iron boiler tubes, 40/ @ 42/6; cast iron,
37/6 @ 40/; flange rails, 47/6 @ 50/; f.o.b.
usual ports. Freight for pig iron from
Glasgow to New York by ordinary steamer
remain steady at 5/ 3/4 ton. Steel is in fair
demand, although the works are not very
fully employed. Swedish iron is quoted,
c.i.f. Thames, less 2 1/2: Hammered, India
assortments, £9. 2/6 @ £9. 10/; hammered,
buyers' specification, £9. basis price; ham-
mered, 3 x 3/8, short bars, £8. 12/6; ham-
mered, 3 x 1/2, short bars, £8. 17/6; rolled,
ordinary assortments, £8. 6/3; rolled, buy-
ers' specifications, £8. 5/; basis price; nail
rods, ordinary, £9. 2/6; nail rods, fine,
£9. 5/6. Steel sleepers are making head-
way, and among the orders taken during
the week is one for 10,000 tons for the
Nizam's State Railway, which has been
placed with Bolckow, Vaughan & Co., the
price, it is believed, being about £4. 15/6.
Old leaf-spring steel is steady at about 50/6.
Steel rails have been much inquired for
since the break up of the combination, but
it is only this week that anything like a
price has been settled. Yet, strangely
enough, there is a marked difference in the
prices quoted. For instance, the Tredegar
Co. have taken about 2500 tons of the
Queensland order at a trifle below £4. f.o.b.,
while 6000 tons of the same order have gone
to Krupp at somewhere about £3 12/6 at
the shipping port. On the other hand
Bolckow, Vaughan & Co. have secured the
Baroda order of 4300 tons and the East
India Railway order for 6000 tons at prices
approximating to £3. 16. At these rates it
is not unnatural that desires should be ex-
pressed for a speedy resuscitation of the
combination. Among the inquiries now
before the market is one for 40,000 tons for
the Midland Railway of India.

SCOTCH FIG IRON

has been very quiet, a Scottish holiday on
Monday, May 3, having the effect of ron-
dering the market rather flatter than be-
fore. The make is still far beyond the ac-
tual wants of consumers and shippers, as is
shown by a further addition of 6114 tons to
Connell's stock last week. There are now
748,190 tons in store, as compared with 595,
293 tons a year ago. There are 94 furnaces
in blast in Scotland, as against 92 last week,
and 95 this date in 1885. Shipments are
33,516 tons in arrears, and importations into
Scotland from Middlesboro' 19,843 tons in
arrears. Current rates are:

Deliverable alongside.	No. 1.	No. 3.
Gartsherrie, at Glasgow.....	43/	41/
Coltness, ".....	47/	43/
Lanark, ".....	44/	41/6
Summerlee, ".....	46/	41/6
Caldar, ".....	46/6	41/
Carnbroe, ".....	43/	40/
Clyde, ".....	43/	40/
Monkland, ".....	39/6	36/
Quarter, ".....	39/6	36/
Govan, at Broomielaw.....	39/	36/
Shotts, at Leith.....	45/	44/
Carron, at Grangemouth.....	45/6	45/6
Kinnell, at Bo'ness.....	45/	42/
Glengarnock, at Ardrossan.....	43/	40/
Eglinton, ".....	39/	36/
Dalmellington, ".....	41/	38/

MIDDLESBORO' FIG IRON

is very quiet at the following prices for
G.M.B., f.o.b. at makers' wharves in
the Tees, net cash:

No. 1 Foundry.	32/6	Mottled	28/6
" 2 "	31/6	White	28/
" 3 "	29/6 @ 30/	Refined metal	47/
" 4 "	29/6	Kentledge	33/6
" 4 Forge	29/	Cinder	30/

The official returns of the Cleveland Iron-
masters' Association for April show a total
make of 188,709 tons. The stocks were
651,860 tons, and the shipments 62,710 tons.

HEMATITE FIG IRON

is fairly steady at about 42/ for mixed num-
bers in usual proportions, but there are those
who look for an early advance in values.
West Coast brands are:

	No. 1.	No. 2.	No. 3.
Cleator.....	43/	42/9	42/6
Lonsdale.....	42/9	42/3	42/
West Cumberland.....	42/9	42/3	42/
Lowther.....	42/9	42/3	42/
Distington.....	42/9	42/3	42/
Solway.....	42/9	42/3	42/
Maryport.....	42/9	42/3	42/
Harrington.....	43/	42/3	42/

BLAST-FURNACE STATISTICS.

The monthly returns of the *Ironmonger*
(London) give the following figures:

General Summary.	
Total number of furnaces	871
Existing, May 1, 1886.....	110
Out of blast May 1, 1886.....	9
In course of erection, May 1, 1886.....	9
On ordinary pig iron of various districts.....	309
On hematite pigs (about).....	91
On spiegel-eisen.....	12
On basic.....	8

THE BOARD OF TRADE RETURNS

for April show a decrease in the imports of
£6,594,436. The exports increased by
£23,592, and were of the aggregate value of
£16,417,804.

TIN PLATES.

In London these commodities remain
steady, but while most of the works seem to
be pretty well off for orders there has not
been so much new business booked during
the week. There are cokes to be had at 13/,
but the ruling rates for good ordinary brands
may be given at 13/3 @ 13/9, f.o.b. Liver-
pool. At Liverpool there continues to be a
fairly steady demand for tin plates. The in-
quiries both for Bessemer steels in coke-tin
grades and ordinary coke tins have come in
pretty regularly. The falling off in the de-
mand has been chiefly for Siemens steels in
coke-finished grades. The inquiries for
these have been much fewer than usual.
The same may be said about charcoal tins,
both ordinary kinds and best qualities. The
demand for tines, though improving, is not
so brisk as would be expected at this time of
the year. The quotations as well as the
prices obtained are on the whole pretty firm,
without much change from last week. Bes-
semer steels, with coke finish, as well as
coke tins generally, are 13/3 @ 13/9 IC for



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Every Pair Warranted. Money Refunded if Imperfect.
If SEYMOUR GOODS have well-hardened Blades, well coated with Nickel, and not, like many, with thin
Nickel wash and soft blades.

250
KINDS
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SIZES.

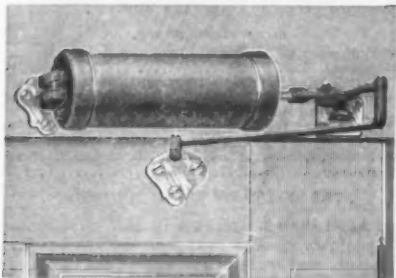


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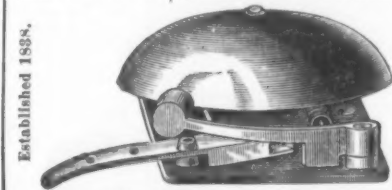
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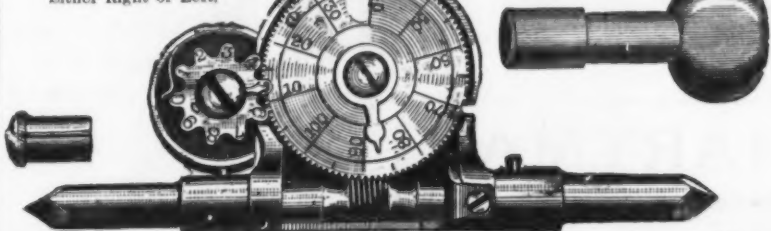
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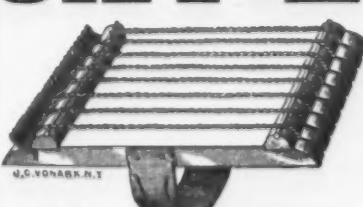


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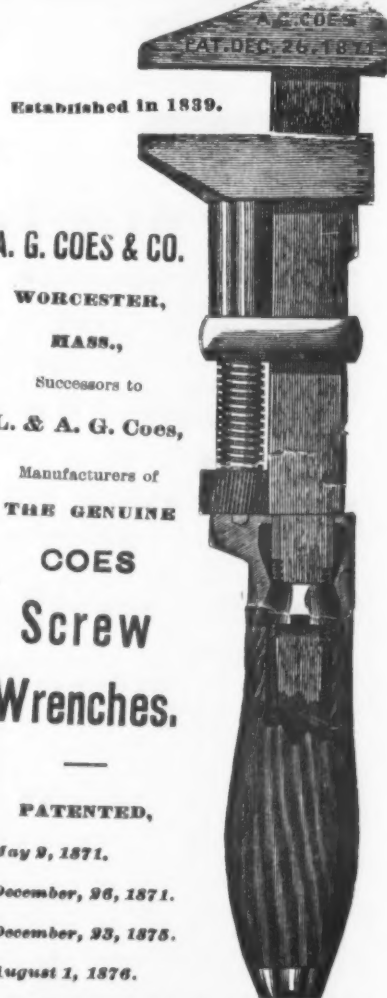
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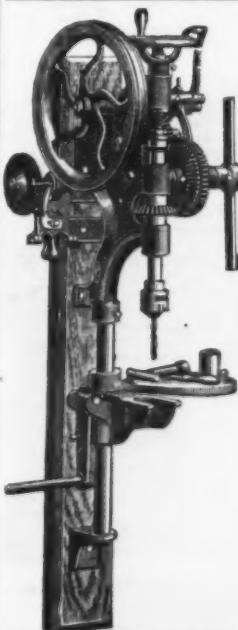


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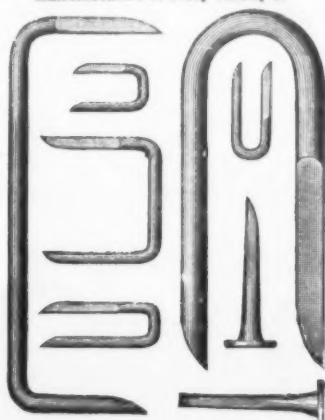


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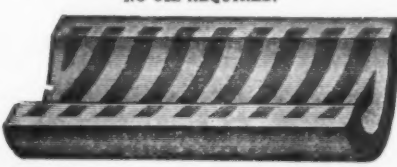
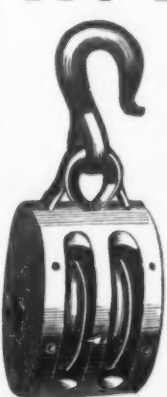
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the former, and 13/3 @ 13/6 IC for the latter. The demand for special sizes in the former runs chiefly on 10 x 20, 14 x 19 1/2 and 19 1/2, with some ordinary sizes, while the coke tins asked for are mostly ordinary sizes. Siemens steels in coke grades are generally speaking still 14/ @ 14/3 IC. Charcoal tins and ternes are without any material change in prices. Coke-tin wasters are in good demand at about 12/6. The stocks of tin plates, which were heavy in the various shipping depots about quarter-day, have been very much reduced during the past month, some unusually large shipments having been made, and this fact must tend to improve prices sooner or later.

THE HARDWARE TRADES.

In London the event of the week has been the opening of the Colonial and Indian Exhibition at South Kensington. With propitious weather and with crowds of colonials to spend, the present London season ought to be, as tradesmen say it formerly was, a sound stimulus to trade. A strong impression prevails that the influx of visitors will be such as to create hopes of a revival in trade, and there is no doubt that the genial weather since the opening of the month has given an impetus which is very encouraging. At Birmingham complaints of trade are still very general, and May has not yet brought the hoped-for improvement. There is a little more business showing on home account, and especially in the agricultural districts of the North and East, but the shipping trade is very dull for the time of year, and special quotations are required for the smallest orders. Makers of baths and toilet-ware do not report very favorably of their experience, but whenever novelties are introduced they find a ready market. The reductions in branded iron have not directly affected iron hardware which are mostly made of enameled iron, but they check any tendency to recovery in price. The gun trade appears to be in a suffering state, but it is open to question whether Birmingham gun-makers are not to some extent responsible for it by neglecting to avail themselves of the mechanical labor-saving processes by which the Belgians economize in the cost of production. At Sheffield, under the favoring influences of the brilliant weather, holiday preparation and activities in the metropolis, the home orders have in many branches of local trade sensibly improved. In the metropolitan manufacturers supplying the furnishing houses and shopkeepers of the West End find a decided enlargement of the demand. In the provincial centers the improvement extends to a somewhat wider range. In the steel, file, edge-tool and industrial departments of the trade generally it cannot be said that there is any substantial access of business in the home market. New railway contracts for materials are scarce. The prices of hematite pig iron have now reached an unprecedented level, and in some quarters there is a confident expectation of an early and permanent rise. The upward movement created by the large American purchases last October has died out, and quotations are now lower than when those purchases began. It is believed that, but for the deadlock which has been created by the labor difficulty in the United States, the exportation of hematite iron would have continued, and that as soon as the troubles of the American ironmasters have subsided these transactions will be renewed.

Foreign Markets.

FRANCE.

PARIS, May 18, 1886.—Metals.—At a slight decline there has been more doing. We quote toward the close in francs per 100 kg.: Copper, Chili Bars, 105 @ 107.50; Ingots and Slabs, 110; Best Selected, 113.75; and Pure Corrocoro Ore, 110. Tin.—Coke Merchant, 14 francs; Mixed, 15; Machine No. 20, 15.50; Finished Axes, 17; Commercial Sheets, 14; Wire Nails No. 18, 22.50, and Polished Chains, Nos. 22 and 23, 42 francs. Coal is moderately active and steady.—*Moniteur des Interêts Matériels.*

BELGIUM.

BRUSSELS, May 18, 1886.—Iron.—At length the situation seems to improve, and there is quite a revival in the demand. Both for Merchant Iron and Beams numerous orders have been received by leading makers. The price of Beams has been raised by common consent by chief makers, and as for Merchant Iron those of Liège and Charleroi have agreed to fix the price of No. 1 at 10.50 francs, with 75 centimes difference between numbers. This is the figure both for home use and export, but the difference in price for export is 50 centimes instead of 75 centimes per number. Production is held in check now by common consent, which is a great element for improving the situation; nor is there any likelihood of underbidding in the export trade now that things look more promising at home. This is the first time that after 18 months of stagnation the Iron trade takes better shape, and it would have to be deplored if everything were spoiled again by too great eagerness to sell at prices barely remunerative. As for Pig Iron Luxembourg remains as cheap as before—3.90 @ 4 francs per 100 kg. Charleroi quotes Foundry 4.70, and Puddling 3.80 @ 4.25. Angles are selling at 11 francs; do. for vessels, 11.75. Sheets may be quoted 11.75 @ 12.50 francs, No. 2; No. 3, 14.50; Commercial, 18; Thin, 20.50, and No. 4, 22, closing firm, with an upward tendency all along the line. Coal is moving off heavily.—*Moniteur Industriel.*

GERMANY.

HAMBURG, May 13, 1886.—Iron.—There has been no change in Rhenish Westphalia during the week, quotations at Düsseldorf remaining as follows: Prime Spiegel, 46 @ 49 marks; do. White Pig, No. 1, 40 @ 42; do. No. 2, nominal; Thomas, 35; Siegen-Nassau, 38 @ 41; Luxembourg, 30; German Foundry No. 1, 32 @ 35; do. No. 2, 30 @ 31; do. No. 3, 40 @ 41; English No. 3 at Ruhrort, 48.50 @ 49. The rolling-mill owners' syndicate at Borsig's works, Upper Silesia, has not yet been formed, but there is every chance that it will be. The dissolution of the international Steel-Rail syndicate has thrown this branch into confusion. The prices paid for Steel Rails in marks, f.o.b. in English ports, have been as follows: 1864, 350; 1867, 260; 1870, 200; 1873, 300; 1876, 150; 1879, 100 @ 90; 1882, 95 @ 90; 1885, 95 @ 90. Pig-Iron production in Germany in March was 287,765 tons, against

319,210 in 1885, the total during the first quarter this year being 854,115 tons, against 935,138 in 1885. But for the general depression in the Iron trade this decrease would have sufficed to stiffen the price. Advances from Belgium and France for the week are a great deal more encouraging, however, the influence of which may soon be felt on this side of the Rhine, so that the general outlook may be considered more promising. Metals.—There has been a good demand for Lead; Copper is weaker; Spelter is firm. We quote German Lead, 4 marks @ 50 kg.; Lake Copper, 52 @ 55; Silesian Spelter, 14.50 @ 15, and Tin, 104 @ 108.—*Borsenhalles.*

HOLLAND.

ROTTERDAM, May 10, 1886.—Tin.—There has been some business doing in Banca during the week at 56.87 1/2 guilders per 50 kg., now 57 asked, while Billiton, May delivery, is held at 56.50. The following statement shows the position of Banca Tin in Holland on the 30th of April, from the official returns published by the Dutch Trading Co.:

	1886.	1885.	1884.
Import in April.....	13,800	12,203	13,963
Total four months.....	45,072	72,144	40,372
Deliveries in April.....	13,900	14,732	13,900
Total four months.....	74,934	34,176	42,594
Stock second hand.....	20,580	46,669	29,483
Unsold stock.....	72,164	118,433	88,903

Total stock..... 92,714 165,302 118,386

Altogether..... Piculs 10,400 2,160 7,900

Statement of Billiton.

Stock.....	17,266	40,035	41,718
Afloat..... Piculs	16,000	22,000	17,000
Quotation, April 30,			
Banca	561 ¹ / ₄ fl	483 ¹ / ₄ fl	531 ¹ / ₄ fl
Billiton	561 ¹ / ₄ fl	481 ¹ / ₄ fl	511 ¹ / ₄ fl

Quotation, April 30.

Banca 50 1/2 fl 98 1/4 fl 53 1/2 fl

Billiton 50 1/2 fl 48 1/4 fl 51 1/2 fl

The Government returns for the month of February are as follows:

Export of Tin from Holland.

	1886.	1885.	1884.
To Germany.....	Tons 536	399	377
England.....	1	9	40
Belgium.....	104	60	85
France.....	32	36	33
Hamburg.....	37	40	32
The United States.....	123	38	31
Other countries.....	11	30	9

Total..... 864 612 615

Two months.....

	1886.	1885.	1884.
To Germany.....	Tons 985	762	779
England.....	37	14	51
Belgium.....	158	116	138
France.....	73	57	57
Hamburg.....	72	50	50
The United States.....	184	67	65
Other countries.....	37	34	52

Total..... 1,548 1,109 1,212

—Koch & Vlierboom.

SPAIN.

BILBAO, May 10, 1886.—Iron.—The weather being variable Iron Ore has been shipped during the week in rather poor condition. Prices have been steady: Campanil, 6 1/4 @ 6 1/2, and Superior Rubio, 6 1/4 @ 6 1/2. Export of Ore so far 1,117,580 tons against 1,094,471 last year. Freighters are very much depressed, and for Cardiff and Newport 3/9 has been accepted.—*Revista Minera.*

AUSTRIA.

VIENNA, May 9, 1886.—Iron.—The Iron market has been quiet and unaltered. We quote at the close in florins per ton: White Pig, 43 @ 44; Gray do., 46 @ 48; Bessemer, 52 @ 54; Styrian Merchant, 117.50 @ 122.50; Bohemian do., 95 @ 96; Sheets for Locksmiths, 145 @ 160; do. for Roofing, 160 @ 170; do. for Tanks, 140 @ 150, and Beams, 160 @ 115. Metals have been steady. We quote Copper, 60 @ 67; Lead, 17.50 @ 18; Spelter, 18.50; Tin, 122.50 @ 125; Antimony, 38.50.—*Austrian Trade Journal.*

EAST INDIES.

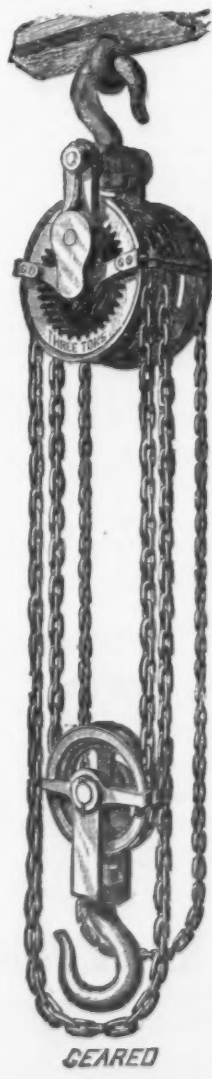
PENANG, April 7, 1886.—Tin.—Has been tolerably firm; the price of Larot improved from \$32.42 1/2 to \$32.60, but for Tonkab lower prices were accepted, the quality of lots arrived leaving much to be wished for. Receipts amounted during the fortnight to 600 piculs, Europeans taking 500 and Chinese 100.—*Schmidt, Kustermann & Co.*

SINGAPORE, April 13, 1886.—Tin.—Sales since our report of March 29 amounted to 150 tons, at prices ranging between \$32.70 and \$33. Supplies continue very moderate, but the demand is quiet, and there are sellers at \$32.75. Tonnage.—The Conference has control of the market and rates have advanced; cargo is not over-plentiful. For New York the Christine is fully engaged, and the August and E. Accame continue their loading at rates already reported. Per Boston the Hooley loads for account of charterers. From Penang the Priam took for New York 421 piculs; the Kashgar 52 and the Palamed 1932. Exchange is weak at 3/4 for six months' credits on London.—*Gilfillan, Wood & Co.*

A French Lift Bridge.

The tonnage of vessels entering and leaving Paris amounts on the average to a little over 4,000,000 tons, and about 1,160,000 tons of this total belong to the traffic of the Ourcq Canal and the adjoining Villetta Basin in Paris. The Ourcq Canal is connected with the Seine, both above and below Paris, by means of the St. Martin and St. Denis canals. The swing bridge which formerly carried the Rue de Crimée across the canal afforded a clear width for vessels of only 25 1/2 feet, while the depth of water was only 6 1/2 feet. The improvement of the Lower Seine rendered these dimensions quite inadequate for the traffic; and the Municipality of Paris, who own these important canals, determined to increase the width at this crossing to 50 feet, and the depth to 10 1/2 feet. A large sewer went along under the street, which, besides affording accommodation for the telegraphic, telephonic and pneumatic services, also contained two conduits, and the summit of its arch reached the old bed of the canal. In order to avoid the introduction of a siphon, on lowering the bed of the canal 4 feet, the sewer was rebuilt under the canal in two branches, with the same bottom level, but reduced in height, one branch serving for the sewer and the second for the other purposes. This work was effected during the ordinary summer stoppage of traffic on the canal for 19 days. A high foot bridge, approached by steps, and a movable road bridge were erected temporarily for the traffic during the construction of the lift bridge, for numbers of foot passengers, about 4000 vehicles and 80 boats traverse the place daily. A lift bridge has been adopted, since it necessitates no raising of the approach roads, as required for an ordinary fixed bridge, to provide the required headway of 17 1/4 feet for the vessels; nor does it interfere with the approach, as in the case of the long tail of a swing bridge. A bridge of the same type, but primitive in form, had been previously erected across the same canal.

The new bridge, as described in the excerpt minutes of the "Proceedings" of the British Institute of Civil Engineers, consists of a movable platform, borne by iron girders and suspended at its four corners by strong chains, passing over pulleys placed on four cast-iron columns, to the ends of which weights are attached for counterpoising the bridge. The bridge is lifted by two double-acting hydraulic presses placed at each



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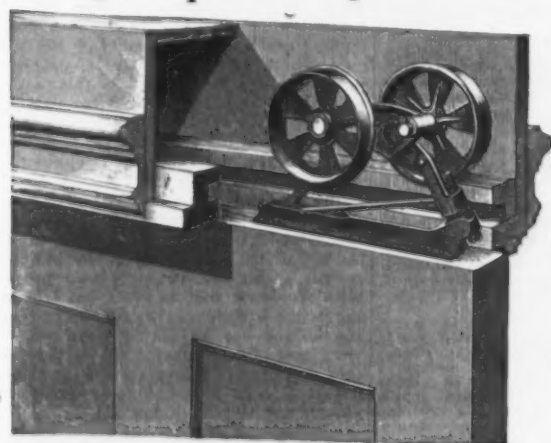
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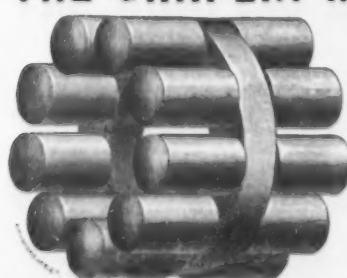
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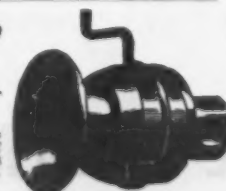
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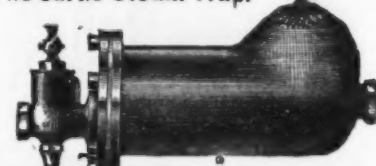


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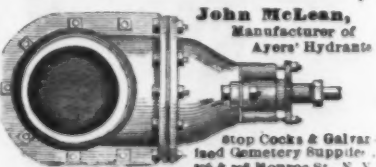


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extremity of its axis; but machinery is provided for raising it by hand, in the event of a failure of the hydraulic apparatus. The equal motion of both sides of the bridge is secured by cross-shafts at each extremity, terminated by toothed wheels at each corner, working in a rack running up each column; and the cross-shafts are connected together by a longitudinal shaft, with conical toothed wheels, to equalize the motion at both ends. To provide against accident in the event of the fracture of one of the suspending chains, a lever is placed below each corner of the bridge, with an arm attached to the end of the chain, which, if released by the breaking of its chain, would force the other end of the lever, by a spring, into the rack grooves of the adjacent column, and thus prevent the descent of the bridge. The length of the bridge is 65½ feet and its total width 25 feet. The roadway is 16½ feet wide and the footpaths on each side 3 feet 11 inches. The hollow columns are 25 feet high and from 2¼ to 2½ feet in diameter. Each column carries a pulley 8 feet in diameter, on which the suspending chain rests, having limbs of 2¼ inch iron. Cast-iron disks 4 feet in diameter, encircling bars at the end of each chain, form the counterpoise weight of 84 tons, which is equal to the weight of the movable portion of the bridge. The total weight of the work is 241 tons, and the total cost was about \$25,000. An iron foot bridge has been erected near the lift bridge, to prevent any interruption of the passenger traffic. This bridge is arched in form. It has a span of 78½ feet, a clear height at the crown above the water level of 22 feet and a width of 11½ feet between the railings.

NEW PUBLICATIONS.

L'INDUSTRIE SIDERURGIQUE AUX ETATS-UNIS. (The Iron and Steel Industry of the United States). Part II. By Paul Trasenster, Liège, Belgium. Desoer, Publisher, Liège. Price, 7.50 francs for both parts.

Some time ago we had occasion to speak of that part of P. M. Trasenster's notes on his travels in the United States which referred to the coal and iron ore and to the blast furnace practice of this country. The second part which, like the first, was originally published as a series of papers in the *Revue Universelle des Mines*, takes up the Bessemer steel works and rail manufacture. Since the well-known centennial series in *Engineering* by Holley and Smith, no connected account of the different works in this country has been published, and while *The Iron Age* has from time to time given fully illustrated descriptions of new plants, and has followed progress in the older works closely, there is always something attractive in any work which gathers widely scattered material. In M. Trasenster's case the additional interest is given to it which attaches to the account of one who, as a foreigner, looks upon our work from another point of view. M. Trasenster is not himself, we believe, what might be strictly called a Bessemer engineer, and his review is therefore, justly, rather descriptive than critical—a position which distinguishes him from the majority of those who rush through our works only to make a fine record for absurdity when they reach home, and condemn what they should have praised, while they laud what we know is capable of improvement.

M. Trasenster gives a description, with plans and elevations, of the old Edgar Thomson, the new Edgar Thomson, the Bethlehem, Homestead, Worcester, Pennsylvania, Joliet, South Chicago, Riverside, Scranton and Pittsburgh converting works. Some of these have not, so far as we are aware, been published elsewhere. M. Trasenster then describes some of the details which are characteristic of some of the American works—for instance, the cooling of the blow with steam, recarbonizing with Bessemer pig and ferromanganese, &c.

The second chapter of his work goes into the subject of rail mills, describing first the general arrangement of the Fritz-Holley blooming train as built at those works, and giving plans of the Harrisburg, Joliet, Cambria, South Chicago, Bethlehem and Scranton rail mills. After going over a number of details, the construction of furnaces, charging and discharging appliances, engines, straightening and cambering, M. Trasenster ventures on the somewhat treacherous ground of costs. He confesses that he found it much more difficult to get at facts on such points than it was to obtain data on the technical methods of manufacture. Many of the figures he gives refer to a period when prices were very low, and they are not applicable to present conditions. The following figures relating to the number of days' labor in the converting and rail departments per ton of product are, however, interesting, since in that regard no changes of any consequence have taken place. M. Trasenster designates the different works by letters, not having authority to publish their names. The first series refers to the converting department of the works enumerated:

A.—Average output 600 tons per day, direct process, 250 shifts, of which 174 are 8-hour shifts and 76 are 12 hour turns, thus making the product per day's labor 2.4 tons.
B.—Average output 750 tons in 24 hours, melting in cupolas, 353 days' labor, including 70 men, unskilled labor, the majority of the balance working 8-hour shifts; product per day's labor, 2.1 tons.
C.—Average output 735 tons, works melting in cupolas, 308 days' labor, of which 245 12-hour and 60 18-hour; product per day's labor, 2.4 tons.
D.—Average product 750 tons, direct process, 200 12-hour shifts, not including boiler firemen, blacksmiths and men at work at refractories, as in the case of C; product per day's labor, 3.75 tons.

For rail mills the following figures are given:
A.—Output of rails, 542 tons per 24 hours, reheating twice, fine, 300 men working 12 hours, product 1.8 tons per day's labor.
B.—Output of blooming train, 850 tons of blooms with 187 days' labor; output of rail mill, 525 tons with 305 men and boys, the majority working 8 hours, thus showing a useful effect of 1.2 tons of rails per day, starting from the ingot.

C.—Product of blooming mill, 671 tons with 145 days' labor, of which 81 were 8-hour shifts and 64 12-hour shifts. Product of rail mill 444 tons with 157 12-hour shifts, showing a useful effect of 1.7 tons rails per day's labor.

On the basis of \$15 pig Mr. Trasenster figures out the cost at \$27, without, however, so far as we can see, making allowance for a number of data which figure very conspicuously in rail cost sheets, and which the estimate of \$1 for general expenses, and \$2 for supplies and sundries, would not cover.

M. Trasenster has evidently traveled to good purpose. His "Notes" are a harmonious whole, displaying great industry, and deserve to rank with the earlier efforts of Tunnor and other leading metallurgists as an intelligent description of our methods.

USEFUL THINGS TO KNOW ABOUT STEAM BOILERS. By G. B. N. Tower. 220 pages. Published by the American Steam Boiler Insurance Co.

This volume, which was compiled by Mr. Tower from various authorities, at the request of the American Steam Boiler Insurance Co., is full of interesting and valuable matter for steam users, and deserves careful study. It is divided into 11 chapters, with an appendix. The first is devoted to boilers proper, and contains fully-illustrated descriptions of various forms of steam boilers now in use. Combustion and general remarks on fuel are embraced in the second and third chapters, which, notwithstanding some statements whose accuracy may well be questioned, will be found to contain many suggestions of the utmost practical value. Tables are given showing the values and properties of various kinds of coal, and supplying also results of tests to ascertain evaporative powers. Corrosion, explosions, defects of boilers, boiler management and fittings and safety-valves are successively taken up and disposed of in an interesting and instructive manner. A chapter of miscellaneous items is added, and supplies approximate rules for calculating the horsepower of boilers, the weights of round iron, boiler iron, &c. The appendix is given up to tables of weights and measures, capacities of circular tanks of varying depths and diameters, shrinkage of castings, melting points of metals, linear expansion of steam-pipes at different temperatures, properties of saturated steam, pressures allowable on boilers, and other matters of equal importance. Numerous engravings are given, adding considerably to the interest of the matter under treatment. While the book is not claimed to be exhaustive, its value cannot be questioned, and makes its examination eminently desirable for those interested with the care and management of steam boilers.

TRIUMPHANT DEMOCRACY; OR, 50 YEARS' MARCH OF THE REPUBLIC. By Andrew Carnegie. Charles Scribner's Sons, Publishers, New York. Price \$2.

The last literary effort of Mr. Andrew Carnegie, whose name is familiar to every one in the iron trade, has probably taken many of his friends by surprise, since he appears as a cordial hater of everything connected with monarchical institutions, and a passionate admirer of the country in which he has dwelt so long and prospered so well. The iron trade knows him as one of its most prominent, as he is one of its shrewdest, representatives, and comparatively few had occasion to recognize in him so ardent a lover of republican institutions. At a time when the great majority of business men feel the hardships of the present keenly, and are inclined to look doubtfully into the future, Mr. Carnegie reviews the past and predicts what is before us with an enthusiasm which sweeps before it all doubts and misgivings. It is probably true that we are too much swayed by the happenings of the hour; that we see in comparatively unimportant events, because they engross attention, serious obstacles to our march of progress. The tendency of those in the rush of the light naturally is to be more keenly alive to its perils and incidents than to the grand steady and irresistible onward march. Mr. Carnegie has done much for Americans if he has strengthened them in their faith in their own country. Pessimists have had full sway during the past few years, and it needs almost violent optimism to stem the tide. Mr. Carnegie shows a sublime faith in the future, and while American readers will, during the perusal of his work, marshal an array of facts to temper his tone or qualify his assertions, they will be found to be deeply and gratefully impressed with the truth of the picture he draws. His fervor is infectious, and we readily overlook its excesses for the sake of the delightful sensation of being carried along by a torrent of enthusiasm.

In dealing with the material resources of the country, with the facts showing what unprecedented rapidity and skill they have been developed and utilized, Mr. Carnegie marshals an array of figures, in an attractive form, which is full of surprises to Americans and must be a positive revelation, especially to Englishmen. Mr. Carnegie attributes perhaps too great a share of our progress to our republican institutions, due probably to his anxiety to draw a moral to influence his readers on the other side of the Atlantic. We fear that in this, as in some other respects, he has overshot the mark. They cannot escape the teachings of figures, nor can they deny to recognize as truth many statements of facts, but Mr. Carnegie's way of hurling at them a series of assertions may stagger while it does not convince. It is certain, however, to clear away a good deal of that startling ignorance of our country which we have so much right to regret and to complain of.

Mr. Carnegie's style is sprightly, and he has succeeded well in clothing in an agreeable form usually dry reading. He frequently illustrates figures in such a way as to bring their magnitude home to every reader. However different the judgment of his readers may be on the merits of his work, whatever may be the impressions it produces upon them according to their point of view, its perusal will be profitable. It has a fascination which few will escape.

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REMOVAL.

The office of this journal is removed to 66 and 68 Duane Street.

The Latest Developments in the Copper Trade.

After a period of considerable maneuvering the Calumet and Hecla Company have once more taken the copper trade by surprise by closing with leading consumers for two months' supply, say 8,000,000 pounds, at 10 cents. We have in the past two months alluded to some of the influences which have been potent in shaping the course of events and which tended to bring about lower figures. To the majority in the trade the lowering of the price to 10 cents has been a genuine surprise, especially since it was believed by many that negotiations looking to some concert of action might be successful. All but one of the Lake companies had agreed to act as a unit, signifying their consent to be subject to forfeiture of funds deposited as guarantees of good faith, and it was known that leading producers in other sections were willing to consider favorably proposals looking to a harmonizing of interests. These efforts have fallen through, a matter deeply to be regretted, since they would have been productive of much good. Among those most prominent in the trade there was a determination to discountenance any attempts to advance prices unduly through the power which an agreement would have placed in their hands, in accordance with the generally acknowledged fact that moderation best insures long life to all combinations. It is to be regretted, therefore, that such an arrangement was not carried out.

The causes which we believe may have led to the action of the greatest copper producer of the country are worthy of careful study. Judging from the output reported thus far, the make of the Lake Superior district this year will reach about 75,000,000 pounds of ingot, though present prices may lead to some curtailment. At figures recently ruling Arizona might have been counted upon to turn out between 20,000,000 and 23,000,000 pounds. Montana might be counted at about 60,000,000 to 65,000,000, and from scattering sources about 5,000,000 pounds may be added. This would run the production at 11 cents for Lake and 10 cents to 10½ cents for other brands to about

160,000,000 to 168,000,000. Considering the fact that the current consumption is estimated to be at the rate of 100,000,000 pounds approximately, there would be left for export about 60,000,000 to 68,000,000 pounds. Now the American market has been relatively higher than that abroad, and the tendency was to produce a contest between the miners of the different sections for this the better market. Formerly the product of Montana, where the greatest increase took place, went abroad almost entirely, but two causes contributed toward diverting a larger share into our channels of trade. Formerly the refiners of the American seaboard used chiefly Arizona raw material, but as the smaller mines collapsed, and some of the largest concerns were controlled by one of the works, the others were forced to seek new sources of supply, and naturally turned to the treatment of Montana mattes. Then the second largest mine of that section built its own refining works. Taking these two facts together, the offerings of ingot copper in our markets increased, although the production was falling off. As the import returns in England show, that market was relieved, while our own was put under increasing pressure. Arizona and Montana copper was steadily and successfully making inroads into territory long held and still claimed by the Lake companies. In the brass trade it is estimated by different authorities that the cheaper grades of casting copper may be substituted for about one-half to two-thirds of the weight consumed. The Lake copper companies had to face the problem of an actual overproduction of high-grade copper and decide whether or not it would be policy to force sales in this country in competition on nearly a level of equality with other brands, or whether it would be wiser to give up the sale of their product for all but the purposes for which its high quality makes it a necessity and sacrifice their surplus abroad. The events of the past years have taught that not alone the excellent copper made from Arizona ores, but also the metal extracted from Montana material, is good enough for a very large percentage of the total consumption. The temptation of a difference in price, ranging from ½ cent to 1½, was too much for the majority of manufacturers, and the Lake metal has been losing ground. Last year out of a total production of 72,000,000 pounds about 28,000,000 pounds of Lake copper, or a little less than 40 per cent., were exported, and in the case of some individual companies it reached nearly 50 per cent. Thus far this year unless the movement were arrested a still heavier proportion would have to go abroad. The Calumet and Hecla Co. have chosen to make a fight for the trade of those who can get along with other brands, and this, we take it, is the principal motive for their action.

It remains to be seen what the effect upon other producers will be. It nips in the bud a number of incipient enterprises launching to revive older Lake Superior mines. It crowds closely the few Arizona concerns now running, and may induce some of them which are not forced to run until exhausted financially to restrict production or stop entirely. It will furthermore wipe out the small margin in making copper in the Butte district, and will divert more of that material to England and the Continent, or compel the companies there to make a determined effort to lower cost by reducing wages. It will furthermore induce some sellers to withhold their supplies, at least for a time, and will compel outside brands to seek a new level of values probably not so remote from that of Lake ingot as hitherto.

On the other hand, the consumption of copper will be benefited by the low prices. This, of course, is a matter of slow growth, but it has already made striking progress, and will continue to expand. In fact, the demand for copper manufactures has grown so rapidly that in spite of the general dullness in business the mills are running as fast as they can, with many of them weeks behind their orders. Additional capacity is needed and may soon be supplied, with the chances in favor of the West as the favored locality.

While discussing this metal we may allude to a valuable table just issued by Messrs. Henry R. Merton & Co., copper merchants, of London, giving an estimate of the world's production. Messrs. Merton & Co. have gathered these figures with commendable zeal, and they are as closely correct as the difficulties of such an undertaking will warrant:

	1885.	1884.	1880.
Algeria.....	850	360	500
Argentina Republic	253	159	900
Australia.....	11,400	14,100	9,700
Austria.....	470	670	470
Bolivia, Corocoro.....	1,500	1,500	2,000
Chili.....	38,500	41,648	42,161
Cape of Good Hope	8,450	5,600	5,028
Canada.....	2,500	2,350	3,662
England.....	15,350	14,769	10,800
Germany.....	800	800	976
Hungary.....	985	1,335	1,380
Italy.....	10,000	10,000	9,500
Japan.....	875	591	500
Mexico.....	778	608	1,500
Newfoundland.....	2,560	2,706	2,436
Norway.....	259	363	600
Peru.....	5,000	5,000	5,081
Russia.....	775	662	1,074
Spain and Portugal	45,949	44,664	35,474
United States.....	74,050	64,700	25,010
Venezuela.....	4,111	4,600	1,800
Total.....	221,715	217,488	158,067

The increase during 1885 was therefore unimportant as compared with the growth from 1881, 1882 and 1883. As we have re-

cently shown, no increase is expected in the leading countries in 1886, while on the contrary the chances are that there may be a heavy falling off. With few exceptions the live mines of the world were worked to full capacity in 1885, and the rage for reducing cost by increasing output has exhausted itself. The copper trade must now wait for the slow process of recovery through the readjustment of the demand to the increased permanent accessions to the supply. That healing process has already set in vigorously.

Flexible Shafting.

To marine engineers few subjects are of more absorbing interest and greater importance than the breakage of screw-shafts. Within the past few years its claims to the attention of ship owners and builders have been numerous and urgent, notwithstanding which very little has been added to existing information on the matter, and practically nothing has been done to devise suitable safeguards against accidents of this character. Broken shafts, while not common occurrences, have, on the other hand, been by no means rare, and deserve a consideration far more important than that of mere economy, and one which cannot be balanced by the insurance which covers only a monetary loss. It can now scarcely be questioned that defective material is not alone responsible for failures of marine cranks and shafts, and that an irregular line of bearings due to unequal wear, changes in shape of the hulls of vessels through the action of the sea or unequal distribution of the cargo, and in some cases to structural weakness, can be held to account for a good deal of damage. Bearings which are out of line naturally entail alternate transverse strains in the shaft at every revolution of the engines, and it is therefore not difficult to trace the immediate causes of fracture. The magnitude of these strains depends, of course, upon the degree of flexure, but even if the latter be extremely small the effects are appreciable. This will be readily recognized when we bear in mind that in a vessel running at a speed of, for example, 12½ knots an hour, with 60 revolutions per minute, or about 288 revolutions per nautical mile, the shaft is bent and unbent 576 times for each mile run, or about 1,510,000 times for an average Atlantic voyage. It will be readily apparent that in addition to the dangers to the shafts, and especially the crank-shaft sections, thus set up an appreciable proportion of the total power developed by the engine is absorbed in rotating the bent shaft and in overcoming the extra friction produced in the bearings.

How to avoid all this has been and is still a problem of considerable interest and importance. Increasing the diameters of shafts was found to augment the difficulties rather than to offer relief, the strains produced on bending increasing in intensity as the squares of the diameter. Flexible shafts and couplings, on the other hand, seemed to have a promising future, and from the outset were deemed worthy of experimental investigation. Couplings of this character were in use more than 25 years ago, but the idea has in practice never yet met with a full measure of success. Renewed attention was directed to it at the last meeting of the British Institution of Naval Architects in a paper on "Marine Engine Cranks and Shafts," by Mr. J. F. Hall, of the well-known English firm of William Jessop & Sons. While in a measure dwelling upon the subject in a general way, Mr. Hall referred more particularly to a special form of flexible crank-shaft and coupling conceived by him and applied practically with favorable results. He argued, and with good reason, that the various strains are localized in the crank-pin and across the webs in the after crank, where the bending effort of the piston is centered, and where the shaft naturally seeks relief when being overcome in its struggles to retain its true shape. In the crank-shaft advocated by Mr. Hall the crank-pin is carried rigidly with its forward web only, and is fitted to the after web in a manner permitting a certain amount of yielding of the latter without injury. It is essentially a ball joint. According to this construction the after crank in a two or three throw shaft is flexible, enabling the propeller shaft in rigid continuity with the after-journal length of the crank-shaft to revolve at an angle to the crank section itself. The crank will further admit of any lateral movement of the propeller-shaft when wear has occurred in the thrust block, or when it has not been properly adjusted. The shaft coupling also is of the ball-joint type. The end center of each half-coupling is cupped out to receive a ball which is inserted between them. On this ball, which retains the axis of each shaft end, oscillate the two shaft ends when they revolve with any angular movement.

As regards this point, however, Mr. Hall has apparently overlooked the fact that propeller shafts are not held rigidly in their bearings, and that the caps with which these are provided serve merely to keep in the oil. The shafts themselves are held down only by their weight. The valuable features of his design are therefore to be found mainly in the crank-shaft arrangement. As evidence of its efficient working he cites the case of a 10-inch flexible crank-shaft which has been in operation for some six months past in a steamer in which great trouble had previously been experienced with the crank-shafting, but which is now giving every sat-

isfaction. On the whole there can be no question as to the value of Mr. Hall's designs, or of the various similar plans which have been proposed and carried into execution at different periods, in throwing light on a most important subject. Flexibility of shafting has long been regarded as a desirable quality, and with a solution of the practical difficulties prejudicial to its attainment engineers would have every reason for congratulation.

Progress in Japan.

Now that with the resumption of specie payment and the reduction of stocks of imported goods business prospects are improving again in Japan, after two years of depression, it will prove of some interest to pass under review late commercial and other developments in that country, especially as the export of American goods thither has of late been on the increase. No half-civilized nation has during the past thirty years made as rapid strides as Japan; in fact, the readiness to adopt what was European and American has been too great, probably, inasmuch as the country and people were not sufficiently prepared for the many radical innovations thrust upon them, and in financial matters great mistakes have occurred because those in power were too sanguine of results and too inexperienced. This with a new nation was, however, to be expected, and does not mar the general result, a great advance toward civilization.

The Japanese Empire, confronting the Chinese coast, has an area of 382,447 square km. and a population of 36,700,118. There are no less than 51 cities having a population of over 20,000, most of them ranging between 30,000 and 50,000. Tokio has a population of 823,557; Osaka, 293,686; Kyoto, 239,425, and Yokohama, 63,048. The budget for 1885 showed an income of \$75,982,969 and an expenditure of as much. Public indebtedness stood on July 1, 1885,

the trade of England amounts to about £16 per capita of the population, that of France to £9, that of the United States to £6, that of Italy to £4 and of Spain to £3, Japanese trade does not exceed 6/ per head. A good many years will have to pass by before increased prosperity forms a new class of people in Japan ready and able to indulge in imported goods, and sufficiently numerous to stimulate the import trade of dry goods, hardware, &c., beyond present amounts, so easily overdone, as late years have shown. In 1885 we imported \$11,953,958, and in 1884 \$11,614,292. Our domestic export in 1885 was \$3,200,663, and in 1884 \$2,476,081. The import into the United States during the fiscal year 1883 from Japan embraced 1,637,815 pounds of camphor, 1,597,946 pounds of rags, 1,275,686 pounds of raw silk, 1038 tons of brimstone and 34,441,455 pounds of tea.

The domestic export to Japan chiefly consisted of

Clocks.....	\$28,394
Cotton goods.....	66,520
Hardware and firearms.....	155,748
Leather and leather goods.....	68,907
Petroleum, 22,965,502 gallons.....	2,538,482
Provisions.....	90,546
Flour, 13,297 barrels.....	68,715
Quicksilver, 64,125 pounds.....	22,662
Other goods.....	286,011
Total.....	\$3,375,885

The Government has put penalties on the adulterations of tea; all tea producers and dealers of a district have been formed into a guild, and this corporation is held responsible in this matter of tea sophistication, and has to take care that no foreign substances are mixed with the leaf, and that the latter is well prepared, properly packed, and that each package is branded with the name of both the farmer and the dealer. This supervision of the main export staple before it leaves the country has had the effect desired, so that Japan tea now competes successfully abroad, wherever consumers have become accustomed to it, with Chinese, Indian and Java.

Maritime Movement in 1884. Vessels Entered.

Flag.	Yokohama.	Kobe.	Nagasaki.	Hakodate.	Total.
	Tons.	Tons.	Tons.	Tons.	Tons.
Japanese.....	9,193	35	6,485	201	141,224
English.....	123	168,359	11	15,289	239
American.....	48	111,515	8	12,136	5
German.....	27	13,044	14	10,373	86
French.....	26	30,441	1	1,149	39
Japanese.....	1	702	1	702	39
Scandinavian.....	1	370	1	450	2
Other flags.....	1	368	1	254	4
Total.....	235	333,622	72	46,758	575

\$250,379,175. There are in operation 265 miles of railway, half of which belong to the Government. The length of telegraphs is 5000 miles, and of wire 15,000. There were 5316 post offices in 1884, forwarding a large amount of matter.

The imports and exports for six years were as follows:

	Import.	Export.
1884.....	\$29,628,000	\$32,992,000
1883.....	28,458,412	33,709,000
1882.....	29,408,080	37,337,856
1881.....	30,832,673	30,307,319
1880.....	36,508,191	27,419,692
1879.....	32,631,000	28,364,000

During the three years 1879-81 taken together there was consequently an excess of import over export of \$13,895,853, and during the three following an excess of export over import of \$18,409,776. The import in detail in 1884 was as follows, in thousands of dollars:

	Yokohama.	Hiro and Osaka.	Nagasaki.	Hakodate and Nigata.	Total.
Cotton goods.....	\$4,924	\$2,944	\$186	.....	\$8,054
Woolens.....	1,481	1,385	10	.....	2,876
Cotton and wool mixed.....	605	15	1	.....	621
Hardware and machinery.....	1,253	690	52	.....	2,004
Sundry merchandise.....	7,136	2,819	556	.....	10,600
Asiatic products chiefly sugar.....	4,032	1,142	299	.....	5,473
Total.....	\$19,435	\$9,004	\$1,104	.....	\$29,543
Bullion and specie.....	\$2,197	\$3,027	\$445	.....	\$5,670
Raw silk.....	\$11,006	.....	\$1	.....	\$11,006
Silk eggs.....	50	.....	.....	.....	50
Tea.....	8,612	2,170	51	.....	5,833
Copper.....	680	96	5	.....	781
Tobacco.....	132	46	66	.....	244
Vegetable ware.....	80	127	5	.....	162
Camphor.....	.....	302	155	.....	457
Drugs.....	122	55	1,600	.....	1,807
Rice.....	145	254	428	.....	827
Dried.....	41	1,181	800	.....	2,092
Other goods.....	5,592	3,069	568	.....	9,111
Total.....	\$21,438	\$7,348	\$3,778	.....	\$32,564
Bullion and specie.....	\$2,985	\$1,591	\$181	.....	\$4,757

The statistics for 1885 show a decreased import from England, a large export to this country, and an increase in the trade of Japan with Germany of 60 per cent. Taking import and export together, England and her colonies still stand at the head of the list, the former with \$16,000,000, and India and Australia with \$19,000,000. For 1885 English trade suffered a decline of \$1,776,055 and China had an increase of \$2,000,000. While French trade declined \$3,000,000 last year, German trade gained \$11,000,000. The import of English cotton goods sank to one-half between 1880 and 1884; the decrease in woollens and mixed goods is less important. The mass of the people in Japan are so simple in their habits, and domestic industry furnishes them what they require so steadily and abundantly, that European exporters of dry goods in particular have of late years been very much disappointed as to the capacity of absorption of the people. While

The new navigation act of Japan regulates through proper certificates which they have to show that captains, machinists, officers and sailors are fit for their employment. Navigation has, moreover, the benefit of daily reports from 23 meteorological observatories. Japan has made rapid strides, and her trade is well worth cultivating.

The statement that Mr. Samuel Thomas, who is now in Alabama, and his associates in his Southern enterprise have now decided to begin the first of their furnaces, to be followed by a second one at an early date, has again put into circulation a number of sensational stories. The death-knell of the furnaces in Eastern Pennsylvania, in New Jersey and New York is again vigorously sounded. It is hardly necessary to protest again against the absurdity of such talk. The situation in the South has not materially changed, except that very satisfactory progress has been made in some important particulars. A few plants still excite the interest of Northern visitors because of exceptional mismanagement, but the majority of them are doing to-day far better than they did a few years since. That period has been fruitful of experience, and better and more uniform work characterizes the greater number of the Southern furnaces. One source of much trouble was the carelessness in mining the ore. Of the three benches in the principal vein the upper one is soft and lowest in lime, the second a little harder and higher in that constituent, and finally the third is characterized still more by these qualities. It is hinted even that there are striking differences in the phosphoric contents of the veins. It has been only too common practice in the South to mine this vein indiscriminately, and thus, as one or the other grade predominates, the physical structure and the chemical composition of the ore supply vary, practically defeating all attempts at long-continued regular working. The Southern ironmasters are beginning to realize this and other similar facts having apparently an unimportant bearing on the subject, and hence their improvement. Mr. Thomas, we understand, will put up a plant which will embrace some novel features, and which will generally embody the results of the experience and study of a lifetime.

Praiseworthy, though misguided, efforts have been lately made to compile statistics relating to current events, the most striking instances of the kind being the data published to show the activity in industrial undertakings in the South at stated periods and the compilations printed bearing on the subject of strikes. The latter are particularly well calculated to illustrate how little they are worth as at present gathered. We have again and again observed that the dispatches in the daily newspapers on the number of men engaged in a strike are

ridiculously exaggerated. The men in the iron works or in the coal mines of some section drop their tools for some reason, and promptly the world is advised that thousands and tens of thousands are idle. Figures are named which would supply the crews for five to ten times the capacity. Such exaggerations are the rule, and those who have learned to appreciate their sensational character have long since ceased to pay the slightest attention to them. The same applies to the sums named as representing the loss due to suspension of work. They are nearly always rough guesses in which those who make them take care, from interested motives, to see that the figures are liberal enough to cover all contingencies, with round sums added for safety. In the excitement of the moment, spurred on by a sense of the injury sustained, those who are the sufferers magnify their losses manifold. To surround aggregates of figures so obtained with the dignity of statistical inquiry is a proceeding against which a vigorous protest should be entered.

The Meeting of the British Iron and Steel Institute.

The English technical papers just at hand contain a full account of the spring meeting of the Iron and Steel Institute of Great Britain, whose proceedings many in the American iron trade follow with close attention. Progress in different countries advances in much more closely parallel lines now than it did only a decade since, and the work of the leading technical societies on both sides of the Atlantic deserves and obtains far greater attention beyond the narrower circle of their membership. At times the matters brought before the Iron and Steel Institute have possessed an interest bordering on the sensational. The spring meeting just closed does not rank among them. Dr. Percy, the veteran metallurgical scholar, delivered a lengthy address, which on the whole does not afford many suggestions for new lines of inquiry or bring forward any facts worthy of being presented to practical American ironmasters.

We may group the papers presented in two classes—those having a direct bearing upon trade matters, and those possessing value rather as contributions to science. A contribution on the "Origin and Progress of the Manufacture of Tin Plates," by Philip W. Flower, of Neath, contains comparatively little which we as consumers, rather than producers, will be likely to treasure as valuable knowledge. We may note, however, some figures relating to the production of tin plates in Great Britain and the home consumption of that country, which are the first which, so far as we know, have been published. Mr. Flower places the make of 1884 at 6,896,000 boxes, and that of 1885 at 7,131,990 boxes, of which 1,832,326 boxes in 1884 and 1,850,000 boxes in 1885 were consumed at home. This is roughly only one-half of what we take, which was 3,572,782 boxes in 1884 and 3,776,877 boxes in 1885. Mr. Flower's statements relating to the history of the introduction of open hearth and Bessemer steel were somewhat sharply overhauled in the discussion, and there was some dissent from his conclusions concerning the relative value of the two grades of material for that specific purpose. He points out justly that there is probably no other manufacture which so severely tests the uniformity of a material as the stamping press, and he holds that for the better class of trade sufficiently uniform quality and reliability can only be obtained when using Siemens-Martin steel, but that for canning the cheaper Bessemer steel answers the purpose. Sir Henry Bessemer endeavored to break the force of this argument. A similar discussion, though in a much more animated form, grew out of the statements made by Mr. John Head, on "Blow-holes in Steel." Mr. Head is associated with Mr. Frederick Siemens in the introduction of that gentlemen's new departure in designing open-hearth furnaces with a high roof, and heating by radiation rather than by the impact of the flame. Mr. Head endeavored to draw inferences from certain phenomena observed in glass-making, when using the new design of furnace, on its influence in preventing blow-holes in steel. It seems that a period of rest is necessary in the old style of glass furnace to get rid of sandy soil or blow-holes, and that this is not necessary when glass is melted by radiation from flame. With glass this period of rest can be given because the material is used in a semi-plastic condition. With steel any stoppage of firing for a length of time is out of the question, because the cast would be too cold. Yet within the limits prescribed by these altered conditions a sounder ingot has been produced. Mr. Head urged that the presence of blow-holes in steel is largely due to the fact that the flame in ordinary furnaces impinges upon the metal, and that when it does not, as in the new design, the trouble from blow-holes is largely mitigated. In this he is sustained by Mr. Ernest W. Harvey, who stated that as a fact the new type gave distinctly better results as compared with the old ones working side by side with it. In the radiating furnace 11 to 13 charges per week are produced of tin bar metal, ranging between 0.11 and 0.14 carbon, and such a heat can be obtained that in making steel castings the metal had been kept in the ladle as long as 24 minutes without producing sculls. Mr. Head, however, created considerable commotion by drawing

comparisons unfavorable to Bessemer steel as compared with the product of the open-hearth process, and by speaking of mysterious failures in steel, which he attributed largely to blow-holes. Mr. Parker, of Lloyds, stated emphatically that in his experience in investigating steel plates for boilers he had not traced one failure to blow-holes, and Mr. Martell, of the same institution, took as strong a ground in favor of steel plates for ships. Mr. E. Windsor Richards, of Bolckow, Vaughan & Co., one of the leading authorities in steel manufacture, admitted that one of the great troubles experienced, especially in casting ingots weighing as much as four tons, was the irregular distribution of carbon in the steel. He tried to overcome this in many different ways, but finally adopted as a very effective method that of casting the steel from one ladle to another, a system which, too, Mr. James Riley, of the Steel Co. of Scotland, had found to answer the purpose perfectly.

Among the other papers presented was one by M. Beck-Guerhard, of St. Petersburg, giving the results of experiments made in Russia with steel rails, in which an elaborate table is presented showing the length of service and reporting the results of mechanical tests and of chemical analysis. It appears that the Russian Government, to avoid the danger due to low temperatures, drifted in the direction of mild steel, only to discover that the rails gave way after a limited period of service. The results of the investigation this provoked led the engineers to recommend a little harder steel. Glancing over the analyses, an American steel-maker would detect many which he would not dare to trust his reputation to, and yet there are instances of curious contradictions. Thus, two rails, having a composition which would credit to a Clapp-Griffiths steel—viz., carbon, 0.10, 0.15; manganese, 0.18, 0.19; silicon, 0.0031, 0.0062; and phosphorus, 0.2793, 0.3373—were sound after 58 and 56 months' service, while a third, running 0.16 carbon, 0.3462 manganese, 0.0046 silicon and 0.2425 phosphorus, broke after being in the track for 65 months under a lighter tonnage.

Mr. Ferdinand Gautier, of Paris, gave some details in the use of chromic iron ore as a furnace lining, while Hamilton Smith, Jr., an American engineer, presented details concerning the wrought-iron pipe lines employed so largely in California hydraulic gold mines. C. Purdon Clarke, of the South Kensington Museum, gave a description of Indian castings, the peculiarity of which is that endless bronze curb chains are cast by the natives. A more elaborate paper was that of Thomas Turner on the constituents of cast iron, the chief result of the investigations proving that cast irons of special chemical purity, and also those containing large quantities of metalloids, are alike unsuited for the best class of foundry material. Mr. Turner's ideal composition is: Graphite, 2.59; silicon, 1.42; phosphorus, 0.39; sulphur, 0.06, and manganese, 0.58. It may be questioned whether closer study may not considerably modify these figures, and it is certainly true that different purposes call for different material, but it cannot be denied on the other hand that progress in supplanting present unsatisfactory empirical methods of ascertaining the best foundry mixtures lies in the direction of a much closer study of chemical composition. It can be and should be made a much more trustworthy guide than it now is, and the day may come when founders will draw up specifications based upon chemical analysis.

Mr. T. V. Powderly has issued another letter, in which he attempts to discuss the question of immigration, and at the same time inflict some punishment upon Mr. Jay Gould. Mr. Powderly takes the position that the poor foreigner is a much aggrieved person. He has been lured to this country by the seductive tales of the unscrupulous agents of railroad companies, only to find on his arrival here how false these representations were. We have no doubt that much of this has been done in the past and that some of it is still going on, but Mr. Powderly's pleading is a deliberate attempt to fasten the blame on them for the entire responsibility of all the misery created by excessive immigration and the low character of many of the foreigners who have come to our shores. The fact is that the great majority of them are induced to leave their native land on the strength of the reports of friends or relatives who preceded them, and because their life in the European country which they left was so intolerable that they regarded any change as one for the better. So long as the difference between the condition of the working classes abroad and here is as great as it is even at this day, so long will a tide of immigration set into this country, fluctuating, of course, with the relative prosperity and depression here and there. The movement is a much stronger one and obeys influences much more powerful than the wiles of a few railroad agents. We do all we can in self-defense against pauper labor and against contract labor. It is becoming evident that it would be wise to apply ourselves to the discussion of the problem whether we can go further, and where we should draw the line. Mr. Powderly would do well to formulate the desires of the interests he is supposed to represent, rather than indulge in the doubtful course of venting his spleen on Jay Gould and the railroad companies.

The excursion of the Eastern Pig Iron Association to Alabama has been postponed on account of the delays which would grow out of the change of gauge on the Southern railroads.

The Bethlehem Meeting of the American Institute of Mining Engineers.

In a more pronounced degree than ever this year's May meeting of the American Institute of Mining Engineers has been characterized by a series of delightful excursions, and by its disappointments, so far as the interest in the sessions was concerned. The mining engineers seem to be succumbing more and more to the temptations of a season which invites trips through the country, and to the charms of hospitality which is lavished to the point of embarrassment. The Bethlehem meeting witnessed the climax in the latter, but, too, was unprecedented in the history of the Institute for the lack of stirring professional papers. The social features are encroaching in a dangerous manner upon the true objects of the Institute, and are creating in the minds of many the conviction that more earnest, serious work can only be accomplished by partly sacrificing what all have learned to enjoy only too well. We question whether such self-denial is a necessary feature of a movement toward the reform discussed, unless it be coupled with the object of avoiding in the future to tax too heavily the hospitality of local members and of friends of the Institute. It remains for those who guide its destinies to decide in what manner a better attainment of its true objects should best be accomplished. It is suggested that the May meeting follow too quickly upon that in February. It has been pointed out that some measures should be adopted to more thoroughly control what papers should be presented in the sessions, and that the important interests in the keeping of the Institute would be advanced if means were sought to secure a more active interchange of opinion through the medium of discussions, which have become the exception rather than the rule.

On Tuesday, the 18th, the first session was held at the Sun hotel, Mr. G. H. Myers, Burgess of Bethlehem, welcoming the Institute. After an appropriate response the president, Prof. R. H. Richards, of the Massachusetts Institute of Technology, delivered a very interesting inaugural address on the subject of "American Mining Schools." He said the object of the schools was to prepare young men for the work, and he thought that the schools had a right to expect the assistance and advice of the works in this preparation. It was at one time thought that the result of school training was to unfit a young man for practical work. But this day had passed, and if a young graduate now went forth full of conceit to proclaim what he knew, and to teach the workman how to do his work, it was in spite of his school training, and not in consequence of it. President Richards thought the improved instruction of the schools in recent years was mainly in the line of improved facilities for practical work. "The mining laboratory," equipped with apparatus for the mechanical preparation, amalgamation and smelting of ores, was to-day a necessary adjunct of efficient teaching. This system of instruction was an outgrowth of American needs, and characterized the "American" mining school. We no longer slavishly imitate German models, but have developed an indigenous system of teaching, as we had already developed an American metallurgy.

Some of the advantages of this system, he claimed, were that the student, while still in the school, gained valuable experience—1, in accurate habits of thinking and writing; 2, in acquisition of independent judgment; 3, in the habit of applying knowledge, which habit stimulates acquisition; 4, in managing men and controlling himself; 5, in appreciating the value of labor and the workman's view of things; 6, in keeping accurate accounts and records of his work; 7, in solving problems that are new to him; 8, in the use of chemistry to control metallurgy, and in the use of technical literature for suggestions and warning.

In considering how the system of instruction could be still further improved in this country President Richards claimed that the technical school should be ranked as a professional school on the level of those of law, medicine and theology. He showed that in these professions a large proportion of the students were college graduates, and while he did not recommend that mining students should take a preliminary collegiate course, he thought an advanced position might be attained by raising the age of admission to 18 years, by requiring French and German, and by lengthening the course from four to five years.

The only paper read during this session was by George W. Small, of Oconomowoc, Wis., on the "Stamp Mills and Calcination Works of the Plymouth Consolidated Gold Mining Co., Amador County, Cal.," one of the most prosperous mines of that State. The description of the methods in vogue does not cover any marked departure from those generally introduced, but many of the details are of considerable interest to those engaged in this line of work, and the statements of cost given show economical and careful management. A few remarks on the general subject of treating rebellious gold ores were made by R. P. Rothwell and E. Gyonbon Spillsbury, of the Haile Mine, South Carolina. Dr. R. W. Raymond exhibited the Wolf safety lamp, which is being introduced into this country by E. J. Schmitz, of this city, its principal features being that it burns benzine, is not easily extinguished, is safe, has an automatic relighting device, and cannot be opened by the miners.

On Wednesday morning the members visited the works of the Bethlehem Iron Co., where the subject of greatest interest was the new engine and train designed by Mr. John Fritz. The engine is a triple compound engine with a comparatively small fly-wheel, so compactly built that it does not convey to the layman an idea of its enormous power. It is equipped with Worthington ejector condensers. The new train is three-high, and is designed to roll direct 120-foot lengths of rails. The cambering, straightening and drilling arrangements are similar in design to those employed at the old mill, except that the cambering is to be performed by pistons instead of by cams. One novel appliance attracted considerable

attention. It is a saw designed to saw off the ends of rails to any desired bevel. The entire frame of the engine and saw is mounted so that it can be turned by a hydraulic piston acting on a rack to an angle of 45°. The advantage of bevel-end rails is that the wheels in passing over the joint have a bearing on metal all the time. A number of such rails, which lie in the track near the Bethlehem station of the Lehigh Valley Railroad, were inspected, and did not show the slightest indications of battering of the ends.

After spending an hour inspecting the works the party were conducted to the spelter and oxide works of the Lehigh Zinc and Iron Co., whence they proceeded to the spelter furnace of the same company. The latter is small, running on residuum, and is chiefly interesting because the Wendt arrangement for gathering the flue dust of zinc oxide by cylinders of wire cloth has been latterly introduced there.

In the afternoon the party visited the beautiful laboratories, library and buildings of the Lehigh University, and then went into session in the chapel of Packer Hall, where they were welcomed by the Hon. Robert A. Lambertson, L.L.D., president of Lehigh University, Professor Richards responding in a few well chosen words, in which he alluded to the rank which the university occupies among kindred institutions in the country.

Mr. C. A. Ashburner, who is connected with the second geological survey of Pennsylvania, gave the substance of a paper on

THE GEOLOGY OF THE WYOMING VALLEY IN CONNECTION WITH THE NANTICOKE DISTRICT.

Mr. Ashburner called attention to the fact that, while the study of glacial action was until recently a matter only of interest to geologists, it has proved to possess considerable influence upon practical mining operations in one of the anthracite-coal districts of Pennsylvania, a number of phenomena having been observed in the Wyoming coal field bearing on the life of the miners and the mining of coal. The glacier, which, according to New England geologists, reached a thickness of as much as 6000 feet in that part of the country, was probably toward its southernmost boundary, which reached the Wyoming field, about 2500 feet thick. The terminal moraine deposited large masses of gravel and detritus in the present Wyoming Valley, which as mining operations receded from the outcrop to the center of the valley first began to attract attention in the shafts sunk through it. In some places the difficulties experienced in sinking through this water-bearing drift led to the abandonment of a number of shafts, among them the Niagara and the Maltby shafts. From the records of the bore-holes and shafts sunk by coal operators collected by the survey it was ascertained in a general way that the course of the old buried valley followed approximately that of the present, the old bed being at places at a depth of 200 feet. The miners were troubled by this glacial deposit in three ways: they encountered it in drifting in their gangways; it troubled them in their operations when the cover was not sufficiently thick, and, thirdly, in sinking their shafts. Though the dangers arising from these facts were fully appreciated by those conducting mining operations, there was nothing to justify any fears or make any precautionary measures advisable in the working of one of the mines of the Susquehanna Coal Co., at Nanticoke. Yet the 18th of December, 1885, a cave-in under an old culm bank on the side of the mountain was caused by the forcing of an enormous mass of gravel into the mine, by which 26 men were entrapped, and according to the conviction of Mr. Ashburner must have perished in less than half an hour after the accident. Mr. Ashburner explained how drillings made by the company indicated the course of an old river bed, nearly parallel to the present Newport Creek for some distance, then turning suddenly northward, with increased fall to approach closely the side of the mountain, and then making another sudden turn. At this latter point the cave-in occurred, and Mr. Ashburner puts forward the theory that through the erosion of the whirlpool at this spot a deep hole must have been made, afterward filled in with gravel. This hole the unfortunate miners tapped, letting in the enormous superincumbent mass of material. Mr. Ashburner insisted that glacial drift did not exist in any other parts of the anthracite-coal regions, and that its dangers therefore need not be feared there.

Mr. R. P. Potwell urged that glacial action had done much to reduce the actual quantity of coal available in the Wyoming field, and stated that the failure to make allowance for it had led to the overestimation of the thickness of coal.

After a brief discussion, in which Mr. John Fulton, of the Cambria Iron Co., participated, Mr. H. M. Howe, of Boston, presented a note

ON THE ATTAINMENT OF UNIFORMITY IN BESSEMER STEEL.

Mr. Howe has obtained a series of carbon determinations of a number of heats at different works, and, drawing averages, has compiled the following table with the object of proving as incorrect the generally prevailing impression that Bessemer steel is not so uniform as open-hearth metal. The second column, giving the average variation, is regarded by him as a guide in estimating the relative uniformity of the different steels:

	Average carbon.	Average variation.	Average manganese.
Soft Bessemer:			
Pittsburgh Bessemer	0.091	0.0025	0.0080
Bellefonte	0.081	0.0034	0.0080
Bethlehem	0.091	0.0036	0.0080
Vulcan	0.073	0.0033	0.0080
Vulcan	0.074	0.0032	0.0080
Clapp-Griffiths	0.089	0.0142	0.0090
Open-hearth:			
Bellefonte	0.135	0.0144	0.0080
Joliet	0.141	0.0185	0.0080
Ashburner	0.154	0.0252	0.0080
Otis	0.125	0.0142	0.0080
Chester	0.151	0.0172	0.0080
Chester	0.140	0.0165	0.0080

On the strength of this compilation Mr. Howe holds that in reality, by modern methods of working, Bessemer steel is more uniform in carbon contents than open-hearth steel. He endeavored to support his case by theoretical grounds. In the discussion

Mr. W. Kent, of Jersey City, called attention to the fact that in open-hearth practice it was not always absolutely necessary to work to exact carbon contents, since a certain amount of latitude was permissible to meet the varying requirements of consumers, and that often the latter specified only a certain range. Mr. G. E. Thackara, of the Spang Steel Co., stated that he had the records to show that they had made 300 successive heats in which the maximum variations of carbon contents did not vary one point, thus showing that it was possible to produce regularly, with great uniformity and within the range of the most exacting requirements.

The session was closed by the reading of a paper by Mr. John C. F. Randolph, of New York, on some Chinese coals which he had occasion to examine a year since.

At the evening session of the Institute C. H. Ashburner gave a sketch of the geological features which would be seen in the various trips made by the Institute. His lecture was illustrated by a geological and topographical map of Northampton County. C. R. Boyd, of Wytheville, Va., then read a paper on "Economic Geology of the Bristol and Big Stone Gap Section of Southwest Virginia." Mr. Boyd staggered the resident blast-furnace men by giving an estimate on the cost of making pig iron in the section of which he spoke. He figures it out at less than \$8 per ton, and thinks that steel can be made for less than \$14. At a later informal meeting of ironmasters at the Lehigh Valley it was decided to blow out an early date and move the plants to the new El Dorado. A few questions were asked by John Fulton, of Johnstown, Pa., and others. Secretary R. W. Raymond, of New York, followed in an interesting discussion of "Recent Constructions of the Mining Law by the United States Supreme Court."

Early on Thursday the party, under the marshaling of Frank Firmstone, visited the blast furnaces, engine-house and other points of interest at the works of the Glendon Iron Co. Then the train sped on to Andover Furnace. The members were shown through the furnaces by J. P. Kent and Mr. Flummert. The points of interest were the blast furnaces and the new furnace equipped with Whitwell hot-blast stoves now being erected. The train was taken to Durham, where the party was taken in charge by B. F. Fackenthal, Jr., manager of the furnaces. A bountiful lunch was served and photographs of the visitors were taken.

At 2.15 p. m. a meeting of the Institute was held in the cave at Durham, at which it was decided to hold the fall session at St. Louis. A comparison of blast-furnace records was given by John Birkinbine, of Philadelphia, a continuation of the discussions of the paper on the operations of the Warwick Furnace, Pennsylvania, read at the Pittsburgh meeting, and the subject was discussed by J. E. Johnson, of Longdale, Va.; Edgar S. Cook, of Potomac; C. J. Rader, of Harrisburg; F. Firmstone, of Glendon; David Thomas, of Troy, N. Y.; B. F. Fackenthal, of Durham, and R. W. Raymond, of New York. The discussion, to which we shall allude in greater detail in the future, was animated in spite of somewhat distracting surroundings. A vote of thanks was tendered the citizens of Bethlehem and others who had assisted in entertaining the members of the Institute.

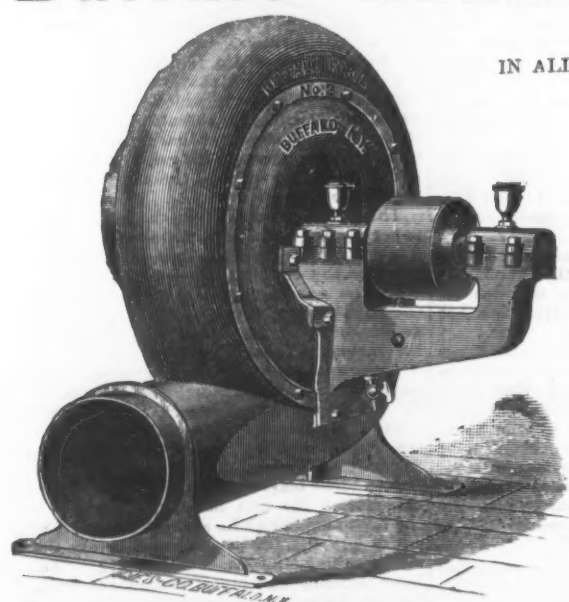
The party were then taken by boats in the Delaware Canal to Milton, where the special train on the Belvidere Division, Pennsylvania Railroad, met the party and brought them back to Bethlehem. In the evening a brilliant reception was given the members at the Lehigh University gymnasium by the citizens of Bethlehem.

On Friday morning there was an excursion by courtesy of the Lehigh Valley Railroad to visit the furnaces of the Thomas Iron Co., at Hokendauqua. There the great blowing engines, with 66-inch steam cylinders, 9-foot blowing cylinders and 10-foot stroke, proved the greatest attraction. The steam pressure is very low, while the blast pressure is about 9 pounds. The Thomas Iron Co. are experimenting with a moderate degree of success with the Conkling concentrator. We understand also that Mr. Thomas, who is the leading spirit in an enterprise now taking shape in Alabama, proposes to adopt an automatic charging arrangement, the stack being carried to the top of the furnace by an inclined plane, and, in contradistinction to similar apparatus, dumping it on the center of the bell. Again taking the train over the Catawissa and Fogelsville Railroad, the party was conveyed to the iron-ore mines at Rittenhouse Gap. In the afternoon a largely attended excursion was made to Wind Gap and to Chapman's slate quarries, where the different processes of mining, hoisting and dressing slate were somewhat hurriedly inspected. On the return to Bethlehem the majority of the members left for their homes, only a small party remaining till Saturday to visit the zinc mines at Friedensville, with the famous pumping engine, the President.

Justice Bradley has handed down an opinion in the United States Circuit Court at Pittsburgh in the suit on an infringement on a patent brought by Francis J. Donoghue against Charles W. Hubbard, Thomas Bakewell and David M. Long. Patrick Donoghue patented an improvement in handles for cross-cut saws in 1864, the right to which, at his death, passed to the plaintiff. The defendants claimed that prior inventions covered all the points of the Donoghue patent, and that the latter was therefore void. The court decided that the plaintiff's patent possesses features not previously patented, and orders a decree entered for the plaintiff, with reference to a master to ascertain the profits and damages sought by the bill.

Owing to the death of Col. S. Churchill, the senior member of Churchill, Thomas & Co., pig-iron commission merchants, Columbus, Ohio, and the non-residence of other members, the business has been sold to a new firm, styled Chamberlain, Wheeler & Co., and composed of Lee Chamberlain, formerly with King, Gilbert & Warner, J. F. Wheeler, formerly manager of Thomas Iron Works, and H. D. Turney, secretary Columbus and Hocking Coal and Iron Co.

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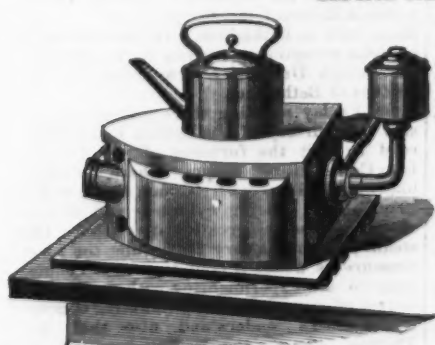


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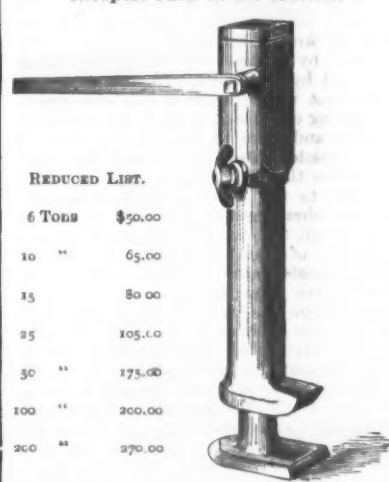
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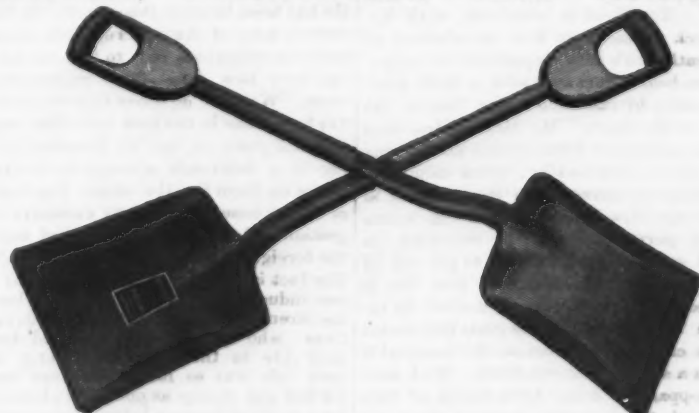


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Hart Wm. R. & Co., Philadelphia, Pa. 6
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Polishing Machines.
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April 21, 1886.

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1 " " 11 in. x 4 and 5 ft.

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1 " 17 in. x 17 in. x 3 1/2 ft.

1 " 20 in. x 20 in. x 4 and 5 ft.

1 " 30 in. x 30 in. x 7 ft.

1 " 30 in. x 30 in. x 8 ft.

1 " 24 in. x 24 in. x 5 and 6 ft.

1 " each 47 in. x 47 in. and 10 ft.

1 Shaper, 10-in. stroke. Pratt & Whitney.

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Also full line of New Machinery.

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For Sale, Machinery & Supplies.

About 115 Magic Screw Plates, new and first-class, at less than cost to make; included are screw Plates cutting bolts 1/4 in. to 3/4 in., also from 1/4 in. to 1 in., with Plug Taps and Pipe Cutting-off and Flareless dies, several sizes from 1/4 in. to 4 in. pipe. \$2000 worth extra quality Plates, lot at old prices. \$2000 worth wood split Pulleys which will pay for themselves in saving cost over any other pulley. Lot of Iron Pulleys at half their cost. 500 lbs. 5-15, 3/4 and 1 in. Square and Hexagon Nuts, 3 to 4 cts. per lb. Lathes, Planers, Drill Presses and Machinery. Prices low.

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500 lbs. 9 in. x 3-16 in. Best Norway Iron. Will sell low. Lot left after finishing a contract. Bars about 4 to 5 feet long.

BEECHER & PECK,
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For Sale,
ROLLING MILL.

The Puddle and Plate Mill known as the Stony Creek Rolling Mill at Norristown, Pa., will be sold low on easy terms. For further information, inquire of JAS. S. SWARTZ, 234 S. 4th St., Phila., or HENRY FREEDLY, Norristown, Pa.

Manufacturers of Hardware, Iron, &c.,
Wishing to be represented in Chicago by resident Agents, with permanent office and sample room and experienced traveler for the Western Territory, the best of references.

Address "RESIDENT AGENTS,"
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TRAVELING SALESMEN wanted to sell a line
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mission to the Retail Hardware, House-Furnish-
ing and Furniture trades. A good opportunity
for energetic men who can take another line in
addition to what they already handle. Address,
with references and particulars as to territory
covered and line already carried.

STODDARD LOCK & MFG. CO.,
Saybrook, Conn.

Trade Report.

New York Iron Market.

American Pig Iron.—The market is very dull and undoubtedly weaker, since outside Irons and odd lots are offered more freely at concessions, without, however, securing much business, since buyers remain indifferent. Standard brands still maintain a solid front, so far as the leading companies are concerned. In the Western markets Southern Iron is reported to be selling at figures as low as any in 1885, a fact which explains the greater urgency with which some of the Southern makes are pushed here and in New England. We quote for standard brands, tidewater delivery, \$18 @ \$18.50 for No. 1 X Foundry, \$17 @ \$17.50 for No. 2 X Foundry, and \$16 @ \$16.50 for Gray Forge, with the market in buyers' favor. Outside brands are 50¢ below these quotations.

Scottish Pig.—There is practically no change, business being confined to jobbing sales, with concessions the order of the day. We quote nominally as follows for small lots: Coltness, \$20 @ \$20.25 to arrive; Gartsherrie, \$19.25 @ \$19.50 to arrive; Shotts and Langloan, \$20 @ \$20.50 to arrive; Carnbroe and Glengarnock, \$19 @ \$19.25 to arrive; Summerlee, \$19.75 @ \$20 to arrive; Dalmellington, \$18.75 @ \$19 to arrive; Eglington, \$18 to arrive, and Clyde \$18.50 @ \$19 to arrive.

Bessemer Pig.—Early in the week under review 5000 tons of a Lehigh make, from Foreign Ores, was sold at private terms. The foreign market is in the position where any orders would put it above the parity of quotations here. We quote nominally Foreign, \$18.75 @ \$19, and Domestic, \$18 @ \$18.50, at furnace.

Spiegel Eisen.—Aside from a small lot of a few hundred tons of 30 % Spiegel, nothing has been done. We quote German Spiegel nominally, \$25.25 @ \$25.50, and English, \$25.50.

Bar Iron.—The men in five of the Philadelphia rolling mills have demanded an advance of 7 %, which has been refused. At this writing their decision in the event of refusal is not known. Should they strike, then it is likely that somewhat reduced offerings would impart a somewhat stronger tone to this market. Any material advance is not generally expected, because there are many other sources of supply. We continue to quote for delivery here in round lots: Common Iron, 1.65¢ @ 1.70¢; Medium, 1.70¢ @ 1.75¢; and Refined Iron, 1.75¢ @ 1.9¢. Store prices are 1.75¢ @ 1.80¢ for Common, 1.85¢ @ 1.90¢ for Medium, and 1.9¢ @ 2.2¢ for Refined.

Structural Iron and Steel.—No contracts of any magnitude have been closed this week, and the market remains dull and fairly steady. We quote for Angles 2¢ @ 2.10¢, delivered, and Tees at 2.40¢ @ 2.45¢, for round lots. Steel Angles are quoted 2.35¢ @ 2.45¢, according to quality. Store quotations remain 2.25¢ @ 2.4¢ for Angles, and 2.6¢ @ 2.7¢ for Tees. American Beams and Channels are 3¢ base from dock for all orders.

Plates.—The end of the strike in the Bituminous Coal districts supplying Central and Eastern Pennsylvania remains the only obstacle to full work. We quote for round lots: Common or Tank, 2.12½¢ @ 2.20¢; Refined, 2¼¢ @ 2½¢; Shell, 2.4¢ @ 2½¢; Flange, 3.4¢ @ 3½¢; Extra Flange, 4¢ @ 4¼¢. For small lots of Steel Plates the quotations are as follows: Tank, 2.70¢ @ 2.75¢; Ship, 3¢; Shell, 3¼¢; Flange, 3½¢, and Fire-Box, 4¢ @ 4½¢, on dock.

Merchant Steel.—A meeting of the Steel Association of the United States was held on the 25th inst. in this city. After discussion it was decided not to add for the present certain lines of steel to the list. Quotations for the range from ordinary to good grades are as follows: American Tool Steels, 7½¢ @ 9¢; Tool Steel of special grades and finer qualities, 12¢ @ 20¢; English Tool, 13¢ @ 15½¢; common grades, 7¢ @ 9¢; Crucible Machinery, 4.5¢ @ 6¢; Round and Flat Spring, 2.6¢; Round-Edge Tire, 2.6¢; Square-Edge Tire, 2.9¢; Toe Calk, 2.7¢; Sleigh Shoe, 2.8¢; Open-Hearth Machinery, 2.5¢, with freight allowance.

Steel Wire Rods.—Beyond a small business nothing is being done. Rods at Antwerp are quoted 107/. The nominal quotation is \$39.50 @ \$40.

Old Rails.—We hear rumors of a sale of 500 tons of T's for shipment to Pittsburgh. We quote nominally \$18.50 @ \$19, with buyers' views generally considerably below.

Steel Rails.—During the past 10 days orders aggregating about 40,000 tons have been placed, including the order of the Atchison, Topeka and Santa Fe, referred to in previous issues. For summer delivery the market is fairly firm at \$34.50 @ \$35 for moderate-sized orders, and indications of shading for large blocks. Fall and winter work is more eagerly sought after. The danger of sales of Foreign Rails is growing, since quotations are reaching very low figures in English shipping ports.

Scrap.—The market is dull at \$18.50 @ \$19.

Rail Fastenings.—We quote Spikes, 2.15¢ @ 2.25¢; Angle Fish Bars, 1.7¢ @ 2¢; Bolts and Hexagon Nuts, 2.7¢ @ 3¢.

Metal Exchange.

The following transactions are reported:

WEDNESDAY, May 19.
12,500 lb Lake Copper..... 10.75¢
THURSDAY, May 20.
10 tons Tin, July..... 21.25¢
5 tons Tin, September..... 21.25¢
25 tons Chili Bars, August..... \$40.10/

FRIDAY, May 21.
5 tons Tin, August..... 21.20¢
5 tons Tin, July..... 21.30¢
5 tons Tin, June..... 21.20¢
5 tons Tin, July..... 21.15¢

SATURDAY, May 22.
12,500 lb Lake Copper..... 10.25¢
MONDAY, May 24.
5 tons Tin, June..... 21.25¢
5 tons Tin, July..... 21.25¢
5 tons Tin, July..... 21.30¢

Philadelphia.

Office of The Iron Age, 280 South Fourth St., PHILADELPHIA, May 25, 1886.

Pig Iron.—The feeling is a little irregular, and some difference may be noted among those whose position in the trade enables them to form a pretty correct opinion. It is conceded that the decline averages from 50¢ to 25¢ per ton from the highest, and that there is some activity at the decline, but beyond that there is no uniformity of opinion. Some appear to think that a reaction is near at hand, and that in any case it is only a question of time, as the period for low prices has passed away; others, and they are in the majority, are of the opinion that there will be no change of importance, but that it will be no easy matter to keep prices steady unless there is a better demand than present circumstances seem to indicate. It is a difficult matter to pass upon, however, with anything like positiveness, as there are influences which may become potent for improvement or the reverse at very short notice, but on the whole the probabilities seem to favor buyers, as production shows a slight excess over consumption, and so long as that continues the market must be in buyers' favor. As regards consumption, there is no probability of increase for several weeks to come, if then, and in the meantime Pig Iron may show a very uncomfortable accumulation. For these reasons, therefore, the market is likely to be a waiting and sensitive one, and one that will respond very quickly to either good news or bad news. As usual on a falling market, outside brands are the weak sisters, selling at 25¢ @ 50¢ per ton below standard makes, and thus lead to a range of quotations seldom met with on a steady market. Southern Irons are offering with some urgency, and from present indications it seems likely that there will be a good deal of Iron from that section during the summer months. Sales during the week have been larger than usual, including low-grade Irons at about \$14 at furnace, and for standard makes of Gray Forge, at tide, \$16 @ \$16.50, No. 2 at \$17 @ \$17.50 and No. 1 Foundry at \$18.50 @ \$19. There is some scarcity of standard brands, and for immediate deliveries outside figures are quoted; others are irregular and can be had at inside rates, and in some cases probably a little less. Alabama Irons of good quality are offered at \$16, \$17 and \$18, ex-ship, with intimations that concession would be made on 500 to 1000 ton lots and upward. One sale of 1000 tons is reported at \$15.50, with bids of \$15 for 1000 to 5000 ton lots; another brand sold at \$15, ex-ship, for 1000 tons, so that \$15 @ \$15.50 may be regarded as fair quotations for this class of Iron.

Foreign Iron.—There is not much disposition to buy, although sellers are prepared to make concessions on firm offers. Asking prices are from \$19 to \$19.50 for Bessemer, and \$25.50 for 20 % Spiegel. One or two small lots of special brands were taken at about \$19.50.

Muck Bars.—The market is dull, and with more sellers than buyers prices are easier at about \$28 @ \$28.50 at mill, according to location, size and quality of bar.

Blooms.—The demand for Iron Blooms is very light and prices difficult to quote, although the asking rates are unchanged. Steel Blooms of all descriptions are a shade dearer, particularly foreign. Prices about as follows: Slabs for Nail Plate, \$30 @ \$31 at tide for Foreign and \$30 at mill for Domestic, and from that to \$35 for higher qualities; special grades for Boiler Plates and other uses requiring high tensile strength, \$36 @ \$39. Other Blooms as follows: Charcoal, \$52 @ \$54; Run-out Anthracite, \$43 @ \$44; Scrap Blooms, \$33 @ \$34, and Ore Blooms, \$34 @ \$35.

Bar Iron.—The demand does not improve, and Merchant Bars are gradually losing their importance as a leading specialty. Most of the mills are working on other articles, such as Band Iron, Skelp, Shapes, &c., the increased demand for which largely offsets the loss of the Bar trade. In this way the mills have been actively employed for several months past, and are still running fairly well up to their capacity, some departments full, others only partially so. Orders have been more irregular of late, however, and for smaller lots, and on the whole the outlook is not very encouraging. The demand for Pipe Iron promises to be large, which is, and for some time has been, the chief reliance of many mills, but apart from that there is nothing to indicate more than an ordinary run of business. Prices are about 1.7¢ @ 1.8¢ for Common and Medium Bars, 1.82½¢ @ 1.85¢ for Best Refined, and sales during the past few days amounting to nearly 4000 tons at 1.85¢ @ 1.9¢ for Skelp Iron. There is some probability of a shut-down at the mills in Philadelphia,

a demand for an advance in wages equal to about 7 % having been made. At a meeting of the manufacturers held at the office of James Rowland & Co. yesterday it was agreed to stand by each other in refusing to make any advance, as the condition of business does not warrant it at present.

Plate and Tank Iron.—There is nothing to report in this department beyond the ordinary run of small orders. Some leading mills are running full, with orders to carry them to the end of next month; others, less fortunate, are running with little more than a week or 10 days' orders before them. This leads to sharp competition for such business as may be offered, so that prices are not more than steady and in some cases have probably been shaded a little. The outlook for new business is not encouraging, inquiries from large consumers being of less importance than usual, showing that new work is coming in only in a very small way. Prices irregular and about as follows: Ordinary Plate, 2.05¢ @ 2.1¢; Tank, 2.1¢ @ 2.2¢; Shell, 2.5¢; Flange, 3.5¢; Fire-Box, 4.25¢; Steel Plates, Shell, 3.25¢; Flange, 3.5¢; Fire-Box, 4¢.

Structural Iron.—The market is decidedly quiet, and but little new business has been entered of late, except in lots of from 50 to 200 or 300 tons each. The outlook does not indicate much improvement in the near future, and, taking everything into consideration, there is little that can be said of a favorable character. Foreign competition has been met with in several recent contracts, so that materially better prices appear to be out of the question, notwithstanding the fact that there is very little margin at figures now ruling, which are about as follows: 2¢ @ 2.05¢ delivered for Angles; 2.1¢ @ 2.2¢ for Bridge Plate; 2.4¢ @ 2.5¢ for Tees, and 3¢ for Beams and Channels.

Sheet Iron.—There is a fair demand, and although prices are irregular (and in some cases quoted very low for inferior qualities) the best makes are steadily held at about the following quotations for small lots:

Best Refined, Nos. 26, 27 and 28..... 4¢
Best Refined, Nos. 19 to 25..... 3½¢
Common, ½¢ less than the above.
Best Bloom Sheets, Nos. 26 to 28..... 4¼¢ @ 5¢
Best Bloom Sheets, Nos. 22 to 25..... 4¼¢ @ 4½¢
Best Bloom Sheets, Nos. 16 to 21..... 3¼¢ @ 4¢
Blue Annealed..... 3¢ @ 3½¢
Best Bloom, Galvanized, discount..... 60¢
Common, discount..... 65¢

Steel Rails.—There is still a very good demand—more, in fact, than the mills can comfortably meet during the next two or three months—although with postponements that can probably be arranged it is not likely that there will be any great inconvenience. Sales have been on a somewhat liberal scale during the past 10 or 15 days, and chiefly at quoted rates, say \$34.50 @ \$35 at mill. No change in price is expected, as the low price of Foreign Rails, delivered at such points as New Orleans or Galveston, brings them in close competition with American Rails.

Old Rails.—Nothing doing in large lots, and no disposition to make offers for more than 50 or 100 ton lots. Prices are therefore almost nominal at from \$20 @ \$20.50, which prices are realized for such small quantities as buyers may require.

Scrap Iron.—Demand fair, but at somewhat irregular prices, but on the whole are about as last quoted: No. 1 Wrought Scrap, \$20 @ \$21; No. 2 do., \$13.50 @ \$14.50; Turnings, \$14 @ \$14.50; Old Car Wheels, \$15 @ \$16; Old Steel Rails, \$20 @ \$22; Fish Plates, \$23.50 @ \$24.50; Cast Scrap, \$14 @ \$15; do. Turnings, \$10 @ \$10.50.

Wrought-Iron Pipe.—The situation remains much the same as reported for several weeks past. The current demand fully absorbs all the product of the mills, and there is every indication that this condition of things will prevail for some time to come. Prices remain very firm at last week's quotations, discounts for large lots being as follows: Lap-Welded Black, 57½¢; Butt-Welded Black, 42½¢; Butt-Welded Galvanized, 32½¢; Lap-Welded Galvanized, 40¢; Boiler Tubes, 52½¢.

Nails.—The market has been quiet during the week and business very light. It is quite evident that forcing sales at low figures has become somewhat profitless, and more often results in weakening prices, without securing the business desired, as sellers almost invariably meet these low quotations, so as to hold their trade. No large demand for Nails will be realized until there is a general quickening in other lines. Prices are irregular, quotations being \$2.25 as the nominal price to dealers, with rebate to large buyers according to quantity and terms.

The Russell & Erwin Mfg. Co. have removed their Philadelphia store from the old stand on Market street to No. 19 N. Fifth street, corner of Commerce. The new location is in a commodious four-story brick building, which has been arranged and fitted under the personal direction of Henry Terry, the manager, expressly to suit their business. The removal was accomplished in the midst of their busy season without any noticeable interruption to their trade.

Chicago.

Office of The Iron Age, 36 and 38 Clark St., Cor. Lake St., Chicago, May 24, 1886.

At the beginning of last week there was every indication that all serious trouble between employers and the laboring classes had ended. The Calumet Iron and Steel Co.,—worked at Cummings—had obtained new

help, and with the return of a portion of the employees who were driven away at the first outbreak were about ready to start up. The employing of another lot of new men aroused the jealousy of the union men (who have been idle for nearly a year), and an effort was made to prevent their going to work. The company succeeded in starting about 50 Nail machines, but the balance of the works are still idle. A trivial disturbance occurred on Saturday night last between the company's special officers and former employees, but was sufficient to engender ill-feeling on both sides, which may result in a serious outbreak at any time. The company contemplate the erection of booths inside their yards for the protection of their men. The Sash, Door and Blind manufacturers who have been trying the eight-hour system have determined to return to the ten-hour day, which is strongly opposed by the workmen and will result in another contest which is likely to affect the whole Lumber trade. The men employed at the Deering Harvester Works are again agitating the eight-hour subject, which may end in a strike and the closing down of the works. The 4000 men employed in the packing houses on the eight-hour day plan show their temper over such trifling difficulties that at the moment there is great doubt whether work will be continued except at ten hours for a day's work. Manufacturers of every description where the eight-hour plan has been tried say they are losing money and must either stop work or run full time. This state of things keeps the public mind unsettled and retards business. Merchants have no confidence in the prices on many lines of goods, and refuse to place orders for anything but immediate delivery. Manufacturers are afraid to make up stocks in advance, because they do not feel sure of being able to sell them in order to meet their obligations. There is, nevertheless, some little improvement noted from week to week, but prospects of a good trade grow less encouraging as the season advances and time shortens.

Hardware.—There appears to be a pretty fair demand in small lots from country merchants. Buyers, however, show considerable hesitation in placing orders for anything except goods that are an immediate necessity. The approach of harvesting time has increased the demand for Grass Scythes, Hay Rakes, Snaithes and the like, but outside of this line their orders continue light. Builders' Hardware is receiving a better call from some sections of the country in small quantities. Carpenters' Tools are said to be in very much less demand than usual at this season of the year. Heavy Hardware is only moderate in call, with a fair demand for Wagon Stock, Carriage Material, &c. It is said that prices are well maintained on the whole line, which is a redeeming feature of the market. Though trade is light, concessions are unnecessary to effect sales. On Carriage Bolts, Strap and T Hinges and a number of other articles frequent changes are made which indicate higher prices. No new or unusual concessions are reported in any line of goods at present.

Barb Wire.—About the best that can be said is that the market is greatly demoralized. Makers and jobbers continue the nominal quotation of 3½¢ for Painted Wire, and 4½¢ for Galvanized, in carload lots. It is likely that this price is well adhered to in such quantities, as there is very little demand for Wire in any quantity, and especially in carloads. In the present condition of the market, if buyers of round lots were to make their appearance it is possible that these prices would be shaded. Printed agreements of the United Wire Co. have been sent to each of the manufacturers recently, setting forth the plan under which the pool is to be formed. The basis of organization is the transfer by each manufacturer of his plant to a company for a nominal sum, leaving the profits to be distributed among the manufacturers according to their several allotments of product. At present it is doubtful whether the pool can be successfully operated, as the interests to be satisfied are so largely diversified and embrace so many kinds and qualities of Wire.

Nails.—The market is weak and full of sellers, but buyers are in less number and exceedingly cautious in placing orders. The \$2.15 card on Steel Nails adopted at Cincinnati has badly broken the market for both Iron and Steel, prices now being very irregular and uncertain. Jobbers quote from store in small lots Iron Nails at \$2.20, and Steel Nails at \$2.30; in both cases, prices could perhaps be shaded 5¢. It is hard to name a price on carload lots of either grade, but there is no doubt that Iron Nails can be had at \$2.10, and Steel Nails at \$2.20 @ \$2.25, 2 ½, 60 days. The demand in a small way is only fair, though some little improvement has been noted during the week. Complaints are frequent that orders that were placed 30 and 60 days ago are being canceled in many cases, and in others specifications not furnished, so that manufacturers have on hand considerable stock that was sold at higher figures which buyers now refuse to receive.

American Pig Iron.—The past three weeks of idleness among foundrymen have had a serious effect upon the conditions of the market. From Charcoal furnacesmen we hear frequent reports of the quantities of Iron that are accumulating and the effect that these stocks will eventually have upon the price. As yet very small concessions

have been made, but there has been a general tendency to weakness on all classes of Iron. Sellers of Lake Superior Charcoal Iron have been quoting during the past week \$20 @ \$20.50 in carload lots, which is a reduction of 50¢ per ton on figures asked ten days ago. In small quantities there continues to be a fair demand from the country, but not nearly sufficient to absorb the Iron that is being produced over and above the amount contracted for. On Coke Irons there is still less demand, but it may be said that there is also less accumulation. No sales have been reported for the week, with the exception of a few carload lots on which quotations are made at \$19 @ \$19.50 for No. 1, and \$18 @ \$18.50 for No. 2. The most complicated conditions of the market occur on this brand of Iron, as the uses for which they are principally adapted bring them in direct competition with brands of Iron that are made in Southern districts and for which there is no settled market price at present. No sales of Southern Iron are reported, but the nominal figure of \$17 @ \$17.50 for No. 1 Foundry is generally accepted as a selling price and has a corresponding influence upon all other brands. No. 2 is quoted at \$16 @ \$16.50 and No. 2½ at \$15 @ \$15.50, cash, according to quantity and demand. Ohio Standard Blackband Irons show less weakness than either of the other grades and may be quoted at \$20 @ \$21; the top price might be shaded 50¢ per ton in more than carload lots. Cinder Mixed Irons are rated in price according to quality and nominally quoted \$17 @ \$18. The future condition of the market depends entirely upon developments in consumption of manufactured articles from now until midsummer. There can scarcely be satisfactory reasons assigned why the demand should largely increase. The fall trade will depend much upon the condition of the Agricultural Implement manufacturers. The sale of this year's stock will determine the quantity to be manufactured for next year's trade. The general impression prevails throughout the country that a better business will spring up during the month of June, in which it is hoped there will be no disappointment. City trade the last few days has been better, yet from the enormous canceling of building contracts the large consuming portion of the Pig-Iron trade is thrown out of employment. Nearly all the foundries are now in operation, but have only a comparatively small amount of work to do. The situation of the market is one of grave apprehension among furnacemen, and developments are watched with a great deal of interest. Rumors are quite frequent that if a further decline occurs it will become necessary for some of those now making Iron to blow out their furnaces, while others who have contemplated blowing in have deferred it until a brighter outlook obtains.

Merchant Steel.—The market for Merchant Steel has been decidedly quiet in the last two weeks. Latterly trade, however, was slightly improved for small lots. Prices are irregular and weak at the following quotations: Tool Steel, ordinary grades, 7½¢ @ 8½¢; Extras, 11¢ @ 13¢; Specials, 16¢ @ 20¢; Open-Hearth and Bessemer Spring Steel (standard brands), 2¼¢; Flat Machinery, 2¼¢; Round do., 3¢; Crucible Machinery, 4½¢ @ 5¢; Crucible Cast Plover Steel, 4½¢, and Patented Plover Steel, 5½¢.

Steel Rails.—The past week has brought some little increase in the inquiries for Steel Rails in small lots. Buyers show some disposition to place new contracts for late summer delivery, but, as they have thus far been unable to obtain any concessions from prices named, orders are withheld. Mills quote \$38 for First Quality, \$34.50 for Seconds, and \$40 for Light Weights.

Bar Iron.—There has been a fair demand for the better qualities of Iron during the past week, the market showing some signs of improvement over the week previous. Jobbers report that there appears to be a better feeling throughout the country, and that merchants and consumers are disposed to anticipate their wants a trifle more than they did during the early part of the month. Makers continue to quote New Puddled Iron at 1.80¢ rates from store, and 1.75¢ base from mill. Old Rail Iron is very weak in price, and quoted at 1.55¢ @ 1.60 from mill and 1.65 @ 1.70¢ from store in small lots.

Structural Iron.—From some sections of the country there has been a tolerably fair demand for Beams out of store. No new contracts have been placed, and in several where specifications were placed for bids they have been recalled. There has been no demand for city trade, and considerable stock that was ordered during March and April is still lying in the yards of manufacturers. Architects, builders, contractors, brick and stone masons and brick-makers are exceedingly dependent over the situation, and are very doubtful as to whether there will be a favorable change in the next 30 days.

Black Sheets.—There is no change to note in the condition of the market. Trading in the better grades is somewhat better than in the poorer quality, but very little is doing in either. Jobbers quote from store No. 24, \$2.80; Nos. 25 and 26, \$2.90; No. 27, \$3. These quotations do not apply to the Best Refined grades.

Galvanized Iron.—There is no work among cornicemen. The market for this class of Iron is very quiet, this being about the only medium of consumption at this time of the year. From store jobbers report a fair demand from country tinnerns, and quote

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Old Rails.—The market has shown considerable weakness recently, and the price quoted by the North Chicago Rolling Mill Co. has been reduced to \$19 Chicago and \$19.50 Milwaukee delivery. Much of the stock on the market is in pretty strong hands, who are still holding it for higher prices. The depressed condition of all lines of trade, however, has a tendency to weaken their hopes of realizing, and they now would undoubtedly sell at figures that were offered several weeks ago if they could be obtained.

Old Wheels.—There has been little or no demand for Old Wheels, and the market is quotable at about \$16 asked and \$15 bid on small lots. Buyers are indifferent about obtaining stock, and are likely to wait until sellers are willing to accept figures offered.

Scrap Iron.—The demand for Scrap during the past week has been very light. No. 1 Wrought is quoted by sellers at \$18, and \$16.50 @ \$17 bid by buyers. No. 2 Mill is quoted at \$14, and No. 2 at \$9. Co. Axles are quoted at \$20; Locomotive Tires, \$21; Wagon Springs, Steel, \$16; Splice Bars, \$16.50; Track Supplies, \$13, and no sales reported.

Pig Lead.—The market shows no important change. Sales have been made at 3½¢, and 4.60¢ bid. The demand is not large, and refiners make no special effort to sell.

Birmingham.

BIRMINGHAM, ALA., May 24, 1886.

Merchandising is dull all over Alabama just now, there having been a remarkable falling off of business in the last 10 days. Bright weather, keeping the farmers at work and thereby cutting off the trade of the country merchants, is the only apparent cause, and this begins to promise ample compensation for temporary lethargy of business. As a general thing the crops are in a very satisfactory condition. Cotton, the main dependence, is well advanced and looks well. New enterprises projected or about to go into operation constitute the most notable feature of the industrial situation here at this writing. The most important item is a furnace promised by Mr. Samuel Thomas, the well-known Pennsylvanian. He, with a number of associates in his State, owns an extensive Iron property near Birmingham, and for several years under the name of the Pioneer Mfg. Co. has had a charter for its development. At a meeting held here a few days ago an increase of the capital stock of this corporation from \$250,000 to \$1,000,000 was voted, and since then Mr. Thomas, who is here now, has announced that he is ready to proceed with his first furnace, and he is taking prices on such of the materials as can be supplied here. He has been coming here periodically ever since he has had interests in this district, and his projects with reference to these have always been anticipated with keen interest as the first practical confession from Pennsylvania on the point of Alabama's exceptional advantages for the manufacture of Pig Iron. Among the other prominent enterprises are a cotton factory and a Bolt and Nut concern, the first being a Pennsylvania and the other an Ohio man's project. One of the most promising of the concerns just commencing operations is the Smithson's Gin and Machinery Works, the staple of whose production will be an improved Pratt gin. A scheme is on foot that promises to put in operation the Birmingham Agricultural Works (agricultural implements), which until now have been held down by lack of capital. An event for the Iron interests had been set down for this week in a visit of some 30 members of the Eastern Pig Iron Association, but the inconveniences threatened by the change of railroad gauge have induced them to postpone their trip for some two weeks.

Pig Iron.—The railroad trouble has almost stopped the shipment of Pig Iron. A large part of the always insufficient rolling stock is already withdrawn from service. Results, however, show that stock has been moving briskly of late. One concern during this month has shipped nearly 1000 tons more than it has made. Business is light and entirely uneventful. Production keeps up to a good average. On this point there was an error in this correspondence two weeks ago. The Sloss Co.'s production of something over 5300 tons in April was put down as the best ever done in the district. Actually only the month before the Alice Co. made 5670 tons, which figures head the record. These give an average of 189 tons a day for two furnaces, whose joint capacity nine months ago was put down at some 150 tons.

Cast Pipe.—This item just now presents a study of some important questions for the South. Several moneyed men in the same line of manufacture in Louisville, St. Louis and Chicago have just been South prospecting for a location for extensive works. Most of their time was spent at Chattanooga. They came here and spent one day in company with one prominent coal and iron operator, visiting a site that he proposed to them, some 12 miles from the city. Birmingham's advantages did not interest them sufficiently to induce conference with the manufacturers of the city, and as soon as they could get back to Chattanooga the newspapers announced that they had decided to locate their plant there. It trans-

Chattanooga.

Office of *The Iron Age*, Carter and Ninth Sts.,
CHATTANOOGA, May 24, 1886.

Up to the present time the season has been very propitious for all growing crops. The condition of the money market is favorable for all legitimate enterprises. There is little difficulty in getting accommodations on reliable paper at what are considered in the South fair rates—that is, 8 @ 12 %. There is no question that the labor troubles of the North and West have affected trade here to some extent, but these troubles, so far as we are concerned, will soon be a thing of the past. There is hardly a manufacturing concern that has not resumed. Considerable amounts of manufactured goods are being stored awaiting the change of gauge about to occur, which will give them unbroken bulk shipments to all points in the North and West. Railroad building is progressing very rapidly on the lines which have been commenced, and the present season will see nearly 700 miles of new track laid in the South, including some few narrow-gauge lines that are only of local importance. The past few days have developed much of interesting matter in industrial lines. The large Pipe works spoken of some time since have made additional purchases of lands to a large extent, that will give them unlimited expansion in case they should need it, and it is now their intention to erect at an early day what will be the largest Pipe works of the country, with a casting capacity of 200 tons of metal per day.

Pig Iron.—The week has developed nothing new to speak of in this line, and everything remains about as last stated. It would be well, however, to mention that the inquiries are much more frequent for small lots than ever before, and sales are being made accordingly. This shows, evidently, that consumers are feeling their way along more carefully than before the strike, not knowing what the ultimate result will be. Taking everything into consideration, the general condition of the Pig-Iron trade, while not satisfactory, might have been in a great deal worse condition than it is. There are large accumulations of stocks in the furnace yards, owing to the inability of the lines to take the Iron away. Much of this has been sold, which will go forward as soon as transportation opens up again. The Southern foundries are unusually busy on railroad and stock work for the fall business. Factories that are manufacturing agricultural implements are all running full, which, of course, absorbs a large amount of Pig, and, taking it all in all, there is very little reason to complain.

Miscellaneous.—While the manufacture of Steel from the Cranberry Ores can no longer be a question of doubt, there is still a reluctance on the part of capitalists to take hold of it extensively. The fact is that the Ores are not as rich in Metallic Iron as first represented, and then the long distance that they have to be transported renders it a mooted question whether the large amount of money that would be involved in erecting a plant sufficiently large to make it an important industry would pay the investors. The Roane Iron Co., of this city, have the matter now under consideration, and should their deliberations result favorably the immense financial resources of the company and the large plant that they have all ready to make it available would render it a much easier task than for any new company to organize to engage in the business.

Cincinnati.

MAY 24, 1886.

Pig Iron.—Dealers report a dull market for immediate delivery, but inquiries from consumers encourage the hope that early in June a greater activity will obtain. Statistics of stocks on hand and estimates as to what the production will be in the coming months of this year indicate that the wants of consumers will be met without delay or material change in prices of Western or Southern makes. The reported shipments of Southern makes of Iron being made and to be made to the Atlantic markets will not, it is thought, affect prices in Western and Northern markets. Quotations of sales for the past week: Charcoal Foundry, Southern, No. 1, four months, \$18 @ \$19; Southern, No. 2, four months, \$17 @ \$18; Hanging Rock, No. 1, best, \$21; No. 1, good, \$20 @ \$20.50; No. 2, \$19 @ \$20. Coke Foundry, Ohio and Western Pennsylvania, No. 1, four months, \$17.50 @ \$19; No. 2, four months, \$16.50 @ \$18; Southern, No. 1, four months, \$18 @ \$18.50; Southern, No. 2, four months, \$17 @ \$17.50; Other grades, \$16 @ \$17. Silver Gray Softeners, Ohio, No. 1, four months, \$17.50 @ \$19; No. 2, four months, \$16 @ \$17; Other makes, various grades, \$15 @ \$16, cash; Charcoal Silvers

Louisville.

W. B. BELKNAP & Co., Louisville, write as follows, under date of May 24 : An improvement in business is noticeable. Trade is gradually picking up again, as confidence is re-established on every side, and the bear arguments based on labor troubles are losing all their force. The eight-hour question, strikes, boycotts, &c., have become extremely unfashionable, and the newspapers are no more loaded down with lurid headlines of what the Knights of Labor are going to do in the way of obstructing traffic or destroying property. This is the logical result of a move which had no justice to back it. The workman has, we think, on examination found that for the past few years he has suffered relatively less than the employer. Factories have been kept running at a loss, that the crews might remain together and custom be retained. The purchasing power of money has increased faster than wages decreased, and the lot of the laboring man in general is not as unhappy as it has been described. Instances of injustice and oppression in some quarters are cited and need correction. The most notable of such is the long postponement of pay-day. We heard recently of one large concern which paid its workmen a month's wages on the third Saturday of the succeeding month, forcing them in the meantime to use orders on the company's store, &c., which amounted to a heavy discount of what was actually due them. This is unendurable and should meet with resistance.

Bar Iron.—The demand still continues slight, but there is no disposition to sacrifice stocks. Prices have been uniform for some 60 days and seem likely to continue so.

Hoop and Band Iron.—Is dull, and Sheet only a little more active for future delivery.

Steel.—Various grades are in fair request, and some of the agricultural concerns are already in the market for next season's supply.

Nails.—Are steady at the late reduction. That was so much more radical than people expected that it is not to be wondered that the market had hardly recovered from the shock.

Wire.—The spring season for Barb Wire is pretty well over and there are no inquiries for any large lots worth mentioning. Prices have settled back to anti-pool figures, and there seems little likelihood of much advance.

GEORGE H. HULL & Co., of Louisville,

report to us as follows, under date of May 25: The market for Pig Iron continues dull; this is usual at this season of the year in this market, but the dullness this year is augmented by the labor strikes and by the quiet market that was a natural consequence from the heavy sales made for future delivery, October, November and December. The actual receipts and deliveries of Iron to consumers is probably larger at the present time than last season, although the sales are quite very smaller. Many furnaces seem quite firm in prices, and, having good sales booked ahead, show no disposition to force the market, but are rather disposed to decline offers unless they are fully up to their views. On the other hand some manufacturers who held off when trade was brisk are now disposed to sell rather than pile up their stocks. The market, in consequence, is irregular. We quote for cash as below :

<i>Pig Iron.</i>		
Southern Coke, No. 1 Foundry.....	\$7.00 @	\$7.50
" " No. 2 "	16.00 @	16.50
" " No. 3 $\frac{1}{2}$ "	15.50 @	16.00
Hanging Rock Coke, No. 1 Foundry.....	16.50 @	17.00
" " No. 2 "	19.00 @	20.00
" " Southern Charcoal, No. 1 Foundry	37.50 @	38.50
Silver Gray, different grades.....	15.00 @	16.00
Southern Coke, No. 1 Mill, Neutral	15.00 @	15.50
" " No. 2 "	14.00 @	14.50
" " No. 1 " Cold Short	14.50 @	15.00
" " Charcoal, No. 1 Mill.....	17.00 @	17.50
White and Mottled, different grades	13.00 @	14.00
Southern Car-Wheel, standard brands.....	25.00 @	26.00
Southern Car-Wheel, other brands	21.00 @	22.00
Hanging Rock, Cold-Blast.....	20.00 @	20.00
" " Warm-Blast.....	20.00 @	21.00

Old Material.—The market for Old Material is dull. Old Wheels and Old Rails are quiet, and more tendency to sell than to buy. If round lots were pressed on the market they would probably be at inside figures. We quote for cash as below :

Rails, $\frac{1}{2}$ ton.....	\$80.50 @	\$81.50
" " 1 ton.....	14.00 @	15.00
No. 1 Wrought, $\frac{1}{2}$ 100.....	..80 @	..90
No. 1 Country Wrought, $\frac{1}{2}$ 100.....	..70 @	..80
No. 2 Country Wrought, $\frac{1}{2}$ 100.....	..50 @	..60
No. 1 Cast, $\frac{1}{2}$ 100.....	..45 @	..55
Boilers, cut, $\frac{1}{2}$ 100.....	..60 @	..65
Boilers, uncut, $\frac{1}{2}$ 100.....	..40 @	..45
Fires Tanks and Sheets, $\frac{1}{2}$ 100.....	..30 @	..35
Burned Scrap, $\frac{1}{2}$ 100.....	..20 @	..30
Axles, $\frac{1}{2}$ 100 lb.....	..90 @	1.00

Detroit.

CHARLES HEMMEL & Co., dealers in Pig Iron, Detroit, Mich., report, under date of May 24, as follows : There has been some little buying done during the past week, the weakness of Southern Irons being strongly exhibited, and now that the strikes here have been pretty well settled the manufacturers are taking hold. It cannot be denied that the Southern Irons can be purchased as cheaply here to-day as at any time during 1885. Whether the balance of the market will follow the lead of the Southern people in making such low figures is still a problem. Lake Superior Iron has kept strong, owing to some large demands East, but we think these demands have hardly been sufficient to sap up the present weekly

The Secret Character of Labor Organizations.

To the Editor of The Iron Age: Perusing the very excellent article on the editorial page of your issue of May 20, "A New Labor Organization Needed," it occurred to me—as, indeed, it has on several previous occasions in the investigation of this subject—that it is somewhat singular that, among the immense amount of writing that has been devoted to the labor question within the past six months, no objection has been urged against the secret character of labor organizations, and particularly as affecting the order of Knights of Labor. This organization has been recognized largely by the thinking part of the community as embodying and advocating at least some commendable features, and particularly as formulated in Mr. Powderly's so-called "secret circulars;" and many employers and manufacturers are or have been inclined to regard the order with considerable favor, recognizing in it a much more com-

At the meeting of the Franklin Institute the report of the Committee on Reorganization was received and portions of it adopted, regulating the construction of a new building; the establishment of a "School of Handicraft" to teach the underlying principles of the several trades, and the handling, use and care of the tools employed therein; a vesting property of the Institute in a board of seven trustees, &c. The amendments to the by-laws which will be necessary to put these recommendations in force were read by their title, and will come up at the next regular meeting.

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Trade Report.

General Hardware.

While there is a slightly better feeling in trade circles, there is no increase in the volume of business. Orders are largely for seasonal goods, with memoranda of miscellaneous and staple hardware to meet current wants. Prices remain substantially unchanged, with slight fluctuations in special lines. Collections are generally reported good, merchants being ready to avail themselves of cash discounts.

NAILS.

There has been an increase in the volume of business in the New York market, and while there has been some irregularity in prices during the week sellers take a firmer stand in resisting efforts to wring from them concessions, while some buyers show a disposition to purchase for future delivery at prices named. It is urged on behalf of manufacturers that the current prices are really as low as any made, taking into account the higher cost of manufacture as compared with former eras of low values. This and other points are brought forward as arguments in support of the assertion that the decline has reached its limit. This view is sustained by the open expressed opinion of buyers that any further concessions would decide them to place orders beyond their immediate requirements. As in the entire Iron and Steel trades, we appear to be approaching a period of suspense from which release will only come after the crop outlook is fairly well defined. We quote \$2 to \$2.15 in carload lots \$2, and store lots \$2 to \$2.15.

The Cobb's Iron and Nail Co. are now offering their Iron Nails at \$1.85 cash, f.o.b. Aurora, Ind.

BARB WIRE.

The local market for Barb Wire is very dull, with little doing. Eastern manufacturers quote 4 3/4 cents for carload lots of Four-Point Galvanized Barb Wire and 4 1/2 cents for small lots.

MISCELLANEOUS PRICES.

The Tack market is quiet, and some of the manufacturers are indicating an indifference as to orders and refusing to recede from their prices.

The agreement among the manufacturers of Strap and T Hinges is working very satisfactorily, and prices are firmly maintained. Some of the jobbers are, however, shading quotations a little, which they are enabled to do on account of their purchases at the late low prices. The general tone of the market in this line is, however, decidedly strong, and it is not unlikely that there will be an advance before long.

Manila Rope, since the advanced prices noted in our last issue, has been held with much firmness, and the possibility of another advance in the near future is intimated.

No change in the price of Screws is announced, but quotations are more irregular. The leading companies are adhering to their prices, but concessions are made with much more freedom by some of the manufacturers.

The manufacturers of Pumps have been in conference, and, after a discussion of the situation with a special reference to the unsatisfactory prices prevailing, it was decided to make an advance of about 10 per cent.

Representatives of a number of the manufacturers of Saddlery Hardware met at Pittsburgh on the 20th inst. to take steps toward the formation of a new organization and to confer in regard to the condition of trade. A proposition to reorganize the association was favorably received, but in view of the absence of some of the manufacturers it was decided to defer definite action to another meeting. The conference adjourned to meet in about a month, when it is expected that all the leading houses in this line will be represented. This action has given a somewhat firmer tone to the market.

The following are the prices of the Empire Wringer Co., Auburn, N. Y., for their Empire Purchase Gear Wringers and their Daisy Wringer, the list prices being subject to a discount of 2 per cent. for cash in 10 days:

	Per doz.
No. 8 Empire Tub Wringers, 10-inch rolls...	\$45.00
No. 4 Empire Tub Wringers, 11-inch rolls...	61.00
No. 5 Empire Tub Wringers, 12-inch rolls...	63.00
No. 8 Empire Bench Wringers, 10-inch rolls...	68.00
No. 4 Empire Bench Wringers, 11-inch rolls...	66.00
No. 5 Empire Bench Wringers, 12-inch rolls...	75.00
Daisy No. 2, 10-inch rolls...	30.00

Their circular also gives a statement in regard to freight allowance in quantities of half a dozen or more Wringers to certain points East and West which are enumerated. The method adopted by the company is to arrange with one dealer to take the exclusive sale of their Wringers in his town.

F. A. Hull & Co., Danbury, Conn., manufacturers of the Danbury Drill Chuck, have reduced the list prices from \$8 to \$6, and make the same discount to the trade as heretofore, namely, 30 per cent. on less than a half-dozen and 30 and 5 per cent. on half-dozen and over.

The F. Hayden Saddlery Hardware Co., Columbus, Ohio, announce, May 20, the withdrawal of all prices and quotations on Japanese and C Plated Saddlery Hardware. It is intimated that slight advances have

been made on a number of articles, the advanced prices going into effect May 20. A revised discount sheet will soon be issued.

The Nason Mfg. Co., 71 Beekman street, New York, announce, May 20, the withdrawal of all quotations, intimating that a corrected sheet of discounts will soon be issued.

The following is the discount sheet of the Penn Lock Works, George W. Nock, 142 North Fourth street, Philadelphia:

	Discount.
Brass Padlocks, Nos. 14 to 24.....	net
Brass Padlocks, Nos. 30 to 34.....	30%
Brass Padlocks, Nos. 34 to 38.....	30%
Nock's Improved Padlocks.....	50%
Scandinavian or Jail Padlocks, Loose Shackles.....	60%
Scandinavian or Jail Padlocks, Fast Shackle.....	50%
Night Latches and Keys.....	50%
Hinchey's Patent Gong.....	50%
Rim Dead Locks.....	50%
Door Springs.....	50%
Bell Pulls, &c.....	50%
Mounted House Bells.....	50%
Bell Cranks, Spikes, &c.....	50%
Alarm Gongs.....	50%
Alarm Gong Hammers.....	50%
Porcelain Escutcheons.....	50%
Porcelain Shutter Knobs.....	50%
Tower Bolts.....	40%
Barred Bolts.....	70%

The Union Hardware Co., Torrington, Conn., and 95 Chambers street, New York, are issuing a circular calling attention to their Safety Dog Muzzles, which are quoted at \$3 per dozen, subject to a discount of 25 per cent. The muzzles are nested in half-dozen, in assorted sizes from No. 1 to No. 6, and packed 12 dozen in small barrels and 18 dozen in large.

The Wringer market is in a better condition than it was some time ago, and prices, with the advance in Rubber, are slightly higher. There is a disposition on the part of manufacturers to avoid the extreme competition which resulted in giving irregularity to prices. The present low prices of Wringers has a tendency to deteriorate the quality, and a firm and united policy on the part of the manufacturers in favor of the maintenance of prices is very desirable.

WIRE NAIL.

In reply to the inquiry in our last issue in regard to the sale of Wire Nails, we have received a large number of letters from Hardwaremen in different parts of the country, in which the desired information is given with more or less fullness and detail. These reports indicate that the Wire Nail has for some purposes come into quite general use, most of our correspondents having sold it to a greater or less extent, a few of them, however, not having yet sold it. The Standard Penny Wire Nail is evidently not very largely sold in competition with the Cut Nail, but several of our correspondents refer to a growing trade in this line. Some of the letters indicate with considerable fullness the uses for which Wire Nails are in the writer's opinion adapted, and in others the objections that are experienced or anticipated are referred to. We are unable in this issue to give extracts from all the letters we have received, but select the following, which are from Illinois, which will be of interest as indicating the position of the Wire Nail in that State. The letters from which the extracts are taken may be regarded as representing the trade both large and small, some of them being from wholesale houses doing an extensive business, and others from merchants whose trade is exclusively retail, some of whom are situated in small towns:

Peoria.—The demand for Wire Nails seems to be very much on the increase in this section, especially among mill men and box makers, and we are having also a growing demand from our country trade for Penny Nails, but as yet they are buying in a small way, one to five kegs at a time. We carry in stock all sizes from 3d to 20d. We believe within a year or two Patent Brads and Finishing Nails will be driven out of the market, and Wire Nails will largely take the place of Cut Nails for many purposes.

Bloomington.—The Wire Brads have largely taken the place of Cut Finishing Nails and Brads. There are also a few special uses for which Wire Nails seem to suit customers better than Cut Nails, but do not think there is any increase in the use of Wire Nails in place of Cut Nails, and the objections to Steel Cut Nails are urged with more cause against Wire Nails.

Decatur.—In our immediate trade they have not yet assumed any prominence excepting in a few points. We, however, think it is only a question of time when they will come more or less into use. The trade that we supply is almost strictly an agricultural trade, and they are proverbially slow in taking hold of new things. Our experience is that some mechanics like them, while others (like the agricultural trade that we speak of) are very slow in trying anything that is new, and disposed to wait for the experience of others. Our own judgment is that their record will be something like that of the Steel Nail, which, when they first came out, were liked very well, but have since fallen into disfavor, from the fact that they are not suitable for use in work that requires to be torn apart, and the Iron Nail answers as well for all permanent work as the Steel Nail.

Peoria.—There is an increase in the sale of Wire Nails, but they are not selling in competition with Cut Nails. Mechanics prefer them for box work, finishing, and other light work.

Galena.—We have no manufacturers in our city that use many Nails, our Nail trade being principally with carpenters. We began by keeping a small stock of Wire Brads from 3/4 to 1 1/4, and had but a limited sale for some time; but lately our builders will not buy any but a Wire Nail, from 3/4 to 2 inch, used for all kinds of molding, beading, &c., and they use a good many 2 1/2 and 3 inch for making door and window frames, nailing on casings, &c.; consequently we do not sell any more Finishing Nails up to 1 1/4 inch and very few Cut Nails.

ing Nails. Do not keep Wire Nails larger than 3 inch.

Freeport.—The sale of Wire Nails is increasing, although we have not made an effort to push them. We cannot say that they are as yet competing with Cut Nails, but have no doubt that in a short time the Wire Nail will diminish the sale of Cut Nails quite materially. Mechanics speak very highly of Wire Nails, and we think they will adopt the smaller sizes (viz., 10d. and under) quite generally.

Peoria.—1. The demand for Wire Brads is increasing, and with me they are supplanting the Iron Brads, but the Steel Nails are not meeting with any favor from the majority of our mechanics and leading contractors, nor am I compelled to keep them in stock to any amount. 2. The objections offered are that in case the Steel Nail bends in driving or is not properly driven, and necessitates being pulled, it is almost impossible to withdraw it without tearing the board. I have examined the Steel Nails closely and find they taper from one side to the other very gradually, and this fact causes them to turn, and consequently hold very firm. In nice work the withdrawing of a Nail mars or breaks the wood, which is not the case with an Iron Nail, possibly because it is formed differently. When a Nail is driven it is generally intended to hold and remain there, but it is customary for mechanics to use their studding for making temporary scaffolds and afterward knock it apart and use it in the building. As far as security goes, the scaffold is made more safe with the Steel Nail, but it renders the lumber unfit for use. It is evident that the above experience applies in the use of the Steel Wire Nails, with which many of our foreign cases are put together, necessitating the breaking to pieces of covers in removing.

Sumner.—As yet we have done but little with Wire Nails, only selling a few of the smaller and lighter sizes, which have given good satisfaction. We believe it will be but a short time when we will have to keep a full line of them. Nails are sold at very small margin in this part of the country. Some want Iron and some Steel, and now we have the Wire Nail claiming our attention. Profits do not justify our keeping the three kinds, and we are holding back to see if we cannot get along with two, and, if so, which kinds.

The following are the expressions of other Illinois Hardwaremen, and represent the position of the Nails in different parts of the State, and for the most part in some of the smaller towns:

We sell very few Wire Nails. They seem to be hard to get started. Our mechanics have not tried them. They shake their heads when we speak of them. We think ourselves that they will come into use with us after a while.

There is no increase in the sale of Wire Nails, and the Standard Wire Nails are not selling in competition with Cut Nails to any extent. The mechanics are afraid to use Wire Nails, but do not give any reason why.

Do not think that Wire Nails will ever come into competition with Cut Nails in the building line. The sale thus far has been forced, as most people are satisfied with the Cut Nails. Mechanics with us do not favor them for general building purposes, for a house nailed with Wire Nails exclusively would almost defy any one to ever think of tearing loose, say, flooring, casing, roofs, &c. Our opinion is that they will be found by furniture manufacturers, box manufacturers and other manufacturers working in wood to hold better than Cut Nails, and to be for many purposes better than Cut Nails. But suppose a man has put up a frame house with Wire Nails, and it becomes necessary to re-side it, who is going to take off the old siding? It is next to an impossibility to do so, for every Nail would have to be cut, whereas the Cut Nails (Iron) will break in two before splitting the wood. For the same reasons we are somewhat opposed to Steel Nails. This Nail business is getting to be a nuisance. Heretofore one line only of Nails was necessary where now three are required. The Brads and Finishing Nails are a nice thing, and we prefer them to the Cut Brad, &c. We may appear skeptical, but we say just what we think of the matter.

There is no sale here whatever on Wire Nails. Have never kept them in stock except a few sizes in small packages. I have several times asked our carpenters if they wished to try them and they invariably say "not now." I rather think they will grow in favor for some kinds of work.

As yet we have had no experience with Wire Nails and have heard of none used in this vicinity.

The following letter is from a gentleman thoroughly conversant with the trade in Illinois and in a position to give an intelligent opinion on the subject in hand:

There is a steady increase of the sales of Wire Nails, flat head, smooth, for general uses, and many carpenters like them for putting on siding, as they drive nicely and do not split the boards, and leave a smooth head to paint over. The Wire Brad has almost wholly superseded the Patent Brad and is likely to do so entirely. There are special kinds of Wire Nails used in certain localities, such as the Bung Head, &c. The manufacturers, in keeping the Wire Nail in all its varieties before the public by way of advertisements, sample cards, &c., are educating them up to their value. The present price of Cut Nails will interfere with the sale of Wire Nails, as the difference is so much, and the claim of the Wire-Nail makers of the gain of 50 per cent. in number over the Cut Nail seems hard to convince the trade of. Many practical mechanics claimed that the Steel Nails were objectionable because of their toughness, as where any work had to be torn down, it was next to impossible to break the Nails. This to me would be an important feature in their favor, but these mechanics are peculiar about some of their ideas, and the Wire Nail would be open to a greater objection even on this point than the Steel Cut Nail. I am sure they will be more widely used each year, however, and more in proportion as prices agree with Cut Nails.

There are still many sections of the country from which we have not received the information requested in our last issue, and we shall esteem it a favor if any Hardwareman will write us briefly, indicating his experience with reference to the sale of Wire Nails and the uses for which they are adapted.

ITEMS.

The Ross & Fuller Association, 33 Chambers street, New York, have been appointed by O. B. Wilson, Collinsville, Ill., agents for his Stock Bells for export and other special trade, and will carry in stock a line of these Bells for the convenience of their customers.

The Black Hardware Co., Detroit, Mich., issue an ingenious acoustic circular calling attention to the Buckeye Lawn Mowers, La Belle Steel Nails, Atkins' Crosscut Saws, Champion Spring Hinges, Kohler's Post Hole Diggers and other lines of suitable initials, with the request that they may be permitted to make quotations on these specialties.

N. R. Streeter & Co., Groton, N. Y., who have been for several years manufacturing the Streeter Magic Flat Iron and Fluter, put on the market last fall a new Sad Iron which they name the Sensible, which is intended to meet the demand for a cheaper article than the Magic. They allude to its desirability and greatly reduced price as having led to an extensive sale, so that they have been obliged to increase their capacity, and are still behind their orders. Their manufactures also include the Sensible Paper Bag and Twine Holder and the Sensible Can Opener.

C. Tinker & Sons, Ashtabula, Ohio, issue a circular describing their Extension Lip Auger Bits, put up in wooden boxes. The Bits are held in place by a simple and what appears to be a satisfactory contrivance.

A decision has recently been rendered in the suit between Hubbard & Co. and Thomas Bakewell, Pittsburgh, Pa., refusing the latter an injunction to restrain Hubbard & Co. from using the trade-mark "Lippincott & Co." This decision is referred to as being a virtual declaration that the trade-mark used by a person or firm is part and parcel of the assets of the establishment, and may be transferred with the sale of the effects and property of the same. This decision is understood as giving to Hubbard & Co. the right to the trade-mark above referred to.

The Trenton Iron Co., Trenton, N. J., issue for insertion in their catalogue new pages 19 and 22, in which the April changes in the list prices of Wire Rope are noted.

Brockner & Evans, 28 Vesey street, New York, issue two pamphlets referring to different departments of their business. One relates to Fencings, and describes their Standard Galvanized Wire Netting, Poultry Fencing and other Standard Woven Wire Fencing, with the illustration of different styles and some specialties. The other is entitled "How to House, Train and Care for the Dog," and is an illustrated catalogue of Dog Houses and Kennels, the Excelsior Traveling Box for Dogs, Kennel Fencing, Dog Benches, Exhibition Cages for Toy Dogs, Feeding Cases, &c. As relating to this line of goods, of which they make a specialty, the pamphlet will be of interest to some of our readers. The shipping box, which is designed for the transportation of dogs to shows and other places, is one of their specialties.

In our recent description of the Star Wire Cloth Measuring and Cutting Machine the manufacturers were spoken of as the Dille Mfg. Co., when they should have been designated as the Dille & McGuire Mfg. Co., Richmond, Ind.

The Moline Pump Co., Moline, Ill., are preparing a pocket edition of their price list, which will be illustrated and contain the latest changes in the list prices of Brass Goods, Iron Fence, &c. It is expected that it will be ready for distribution in about a month. Their 1885-86 illustrated catalogue and price list illustrates and describes their line of Iron Lift, Force and Cistern Pumps for hand and mill use, as well as Wood Suction and Chain Pumps, Rubber Buckets, &c. Ferdinand Phillips, who has had considerable success during the last nine years in designing and constructing special machinery used by Hoopes & Townsend, Philadelphia, has resigned his position, and it is intimated that his attention will probably be given to the development of Phillips & Townsend's Wire Nail works, of which firm he is a member.

The Reading Hardware Co., Reading, Pa., and 81 Reade street, New York, have just sent out an index to the extra pages which have been issued for their 1885 catalogue.

Moeller & Manger, Newark, N. J., announce, May 20, that they have contracted with Tower & Lyon, 95 Chambers street, to take their entire product of Dish Lamps, Police Lamps and other Lanterns, thus enabling them to devote their energies to the manufacture of these goods, while the marketing of the goods will rest with their agents. It may be added that Tower & Lyon will have entire control of the prices at which these goods will be sold, and they are about issuing a catalogue as an annex to their catalogue No. 5, in which these Lanterns are illustrated, with revised list prices. It is an attractive pamphlet in which the paging is carried on from their No. 5 catalogue, with which it corresponds in size of page and typographical appearance. It represents a line of Dash Lamps, Pocket Candle and Oil Lamps, Flat Pocket Dark

Lanterns, Police Dark Lanterns, Cycle Lamps, Railroad Lanterns, &c., with the intimation that, in addition to the goods illustrated, a line of Steam Gauge Lamps, Locomotive Oilers, Oil Fillers, Engineers' Hand Lamps, &c., are manufactured.

The Wiley & Russell Mfg. Co., Greenfield, Mass., are about to issue a new catalogue of their machinists' and blacksmiths' labor-saving tools, in which some new goods are represented, and the representation of their varied line brought up to date. Among the new goods to which they direct attention are the new Green River Screw Plates, which are presented in addition to their Lightning Plates, nine sets, ranging from Bolts and Nuts from 1/8 inch to 1 1/4 inch. The new die, it is stated, can be depended upon to give full satisfaction, having been thoroughly tested, while its simplicity gives it an advantage as to price. The company have also increased the number of styles of their Green River Drilling Machines, and made additions to their Blacksmiths' Tools, including two new Green River Tire Shrinkers. Reference is made to the merits of the goods, as resulting from the care taken in their manufacture and the quality of the steel used.

The following is the text of Article 10 of the constitution of the Hardware Association of Cincinnati, and indicates one of the purposes for which the organization was formed:

The association shall furnish and keep at all times a book in which at any time members of this association can record the names and addresses of delinquent debtors, which shall be open to inspection to all members for their benefit only. Members are requested that if they so find a name recorded as being unworthy of credit, and if they are also a creditor of said party so recorded, that they put said name on record again.

J. R. Torrey & Co., whose New York office is at No. 97 Chambers street, under the management of David Eastman, have secured the exclusive sale of the Canastota Knife Co.'s products, and show at the above address the only line of the company's samples to be seen outside the factory. The Canastota Knife Co. have withdrawn their travelers, and their customers will in future be supplied through J. R. Torrey & Co.

It will be seen by their announcement on page 18 that Haydock & Bissell, the Hardware auctioneers, 12 Murray street and 15 Park Place, New York, will hold an important sale June 9 and 10, in which a large assortment of Hardware will be offered, together with Stamped and other Tinware, and other lines which are specifically referred to in their advertisement.

The New York office of Laughlin Nail Co., manufacturers of Steel Cut Nails, also of Lambert & Bishop Wire Fence Co., manufacturers of Plain and Barbed Wire (for both of whom W. K. Ross is general agent), is removed to No. 33 Chambers street.

HAY KNIVES.

The following circular relating to patents on Hay Knives is being sent out by Hiram Holt & Co., East Wilton, Me., to dealers in and users of Hay Knives. As referring to a well-known article, and also to certain general principles of patent law, it will be of interest to our readers:

It is not necessary to set forth to you the merits of the celebrated Lightning Hay Knife. It has been manufactured exclusively by Hiram Holt & Co., at East Wilton, Me., for many years. Until within a very short period it has been in universal use throughout the United States. Our object in addressing you at the present time is to inform you that there has started into existence very recently various infringements upon the patent of George F. Weymouth, under which the Lightning Hay Knife is manufactured. It is our purpose to prosecute all such infringements, and to hold responsible to the full extent of our ability and of the law all parties who manufacture any knife infringing upon the patent or who deal in the same.

To correct false impressions which may be created in the interest of those who are endeavoring to obtain a business advantage by appropriating our property, by the statements that our Weymouth patent cannot be maintained, we desire to make a plain statement of facts. The invention patented to George F. Weymouth is embodied in a sword-shaped blade provided with operating handles for working the same, the edge of the sword-blade being furnished with knife-edged serrations or teeth. As is well known to all persons who have owned letters patent for inventions, it has been the uniform decisions of the courts for nearly half a century that a patentee who had failed to make every claim of invention to which he was entitled by the facts shown in his specification, model and drawings, could surrender his original patent and re-issue the same so as to more fully cover and protect every portion of his invention. We availed ourselves of this privilege, and obtained Reissue Letters Patent No. 10,072, dated April 4, 1882, and under this patent, so reissued, we commenced suit against Kendall & Holden in the Northern District of Illinois.

It is also equally well known to all persons interested in patent properties that the Supreme Court of the United States in the spring of 1882 had occasion to review the law on the subject of reissue patents in the famous case of Miller vs. Bridgeport Brass Co., and came to the conclusion, which it has since repeated in many cases, that a reissued patent for the purpose of enlarging the claims of the original patent was not valid unless the patentee made application for such enlargement within a reasonably short time after the granting of the original patent, and in no case could such reasonable time extend beyond the period of two years. Under the strict application of this rule our reissued patent in the case above mentioned

Cuba.			Iron, pags....	20	81
			Hdw., pkgs...	19	271
Copper stills.	4	250	China.		
Mf. iron, pkgs.	3080	9,677	Mf. iron, pkgs	2	125

L. COES'
GENUINE IMPROVED
Knife Handle
PATENT
Screw Wrenches
MANUFACTURED BY
L. COES & CO.,
Worcester, Mass.
ESTABLISHED IN 1839.




Patented July 6, 1880.  Patented July 8, 1884.
Registered March 21, 1874.

Sectional view illustrates our NEW KNIFE HANDLE, showing Malleable Iron Frame and Shank of Bar keyed into position.
Straight Bar, Extra LONG NUT FOR SCREW IN JAW.

The Best Made and Strongest Wrench in the Market.
Send for Illustrated Price List and Circular.

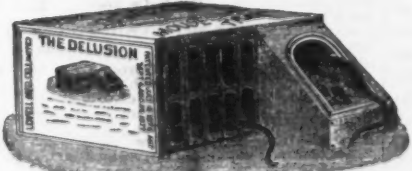
J. C. McCARTY & CO.,
NEW YORK.
Sole Agents.

ILLINOIS IRON & BOLT CO.,
Nos. 20 to 26 Main Street, Carpentersville, Kane Co., Ill.,
MANUFACTURERS OF
BLACKSMITHS' TOOLS,
Pat'd May 15, 1883.




PATENT STEEL WAGON SKEINS,
Jack Screws, Tire Benders,
Track Jacks,
Carriage Makers' Vises,
SAD IRONS, COPYING PRESSES AND STANDS, ETC.

The Delusion Mouse Trap.



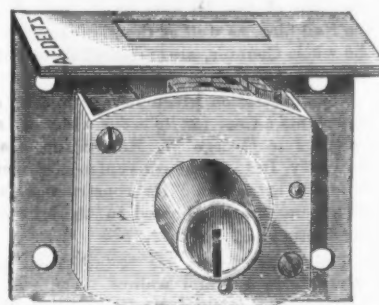
The Mouse goes in to get the bait,
And shuts the door by his own weight.
And then he jumps right through a hole,
And thinks he's out; but, bless his soul,
He's in a cage, some how or other,
And sets the trap to catch another.

Over Two Million of the Delusion Mouse Traps
have been sold since it was put upon the market, and the sales are increasing
rapidly each year. No better evidence could be produced to
show that it exactly meets the wants of the public.

LOVELL MFG. CO., LIMITED, Erie, Pa.,
MANUFACTURERS OF
Clothes Wringers,
Delusion and Bonanza Mouse Traps,
The Folding Wire Rat Trap,
Erie Rat Trap, &c.
Send for Catalogue.

E. MERRITT & CO.
ESTABLISHED 1859 — BROCKTON, MASS.
The Only Manufacturers of a Complete Line of
TACK AND NAIL MACHINERY.
SEND FOR CIRCULAR. — UPRIGHT DRILLS.

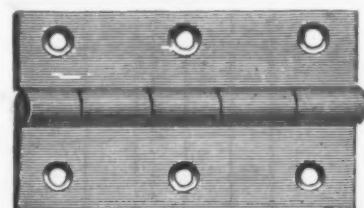
A. E. DEITZ.



No. 51 Lock.

J. C. McCARTY & CO., Agents,
97 Chambers and 81 Reade Sts.,
NEW YORK.

Factory, BROOKLYN, E. D., N. Y.



W. & J. TIEBOUT.
MANUFACTURERS OF
MASS, GALVANIZED & SHIP CHANDLERY
HARDWARE.
Nos. 16 & 18 Chambers Street,
NEW YORK.

ALWAYS GIVES THE
UTMOST SATISFACTION
Main Belting Co.,
Manufacturers of
THE LEVIATHAN
COTTON
BELTING.
Unsurpassed for
Strength, Durability and
Cheapness.
Made to any Length,
Width and Str. gth.
Main Driving Belts.
Guaranteed to Run
Straight, Even Through
out.
No Cross Joints, Un-
affected by Damp
Clings well to the Pulley.
Has no equal. In fact,
is THE BELT.

MAIN BELTING
COMPANY,
S. W. cor. Ninth and Race
Sts., Philadelphia.
Also
228 East Randolph St.,
CHICAGO.

THE CHAMPION LEVER BLOWERS & FORGES

Are the Leaders of the World.



An entirely novel
construction. "They
have no equal." No
Cog Wheels, Ratchets,
Pawls, Gum Balls or
other Friction De-
vices to wear out in a
short time. Easy Mo-
tion, Powerful Blast,
Noiseless and Dura-
ble. Guaranteed to
give entire satisfac-
tion. Write for cata-
logue and prices.

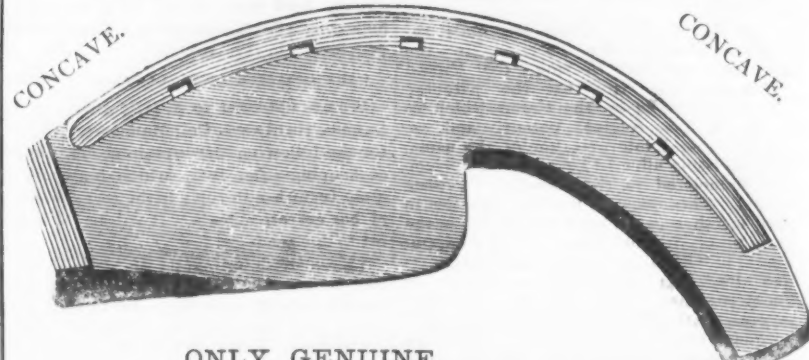
CHAMPION BLOWER & FORGE CO.,
Corner Cherry and James,
LANCASTER, PA.

USE THE *Mason*
Pressure Regulator
FOR STEAM PUMPS

USE THE *Mason*
SPEED GOVERNOR
FOR STEAM PUMPS.
THE MASON REGULATOR CO.,
Manufacturers of Steam Traps, Pressure Regulators,
and Speed Governors for Steam Pumps, Damper Re-
gulators and Reducing Valves.
22 Central St., Boston, 115 Liberty St., New York.

F. DEMING,
BUILDER OF
SPECIAL MACHINERY,
WATERBURY, CONN.

"GREENFIELD" FORGED OX SHOE.



ONLY GENUINE.

Made under the Parker and Colburn Patents, from Burden's H. B. and S. Iron. Nailholes punched, and every shoe perfect. The Parker and Colburn Patents cover broadly the dies in which the shoes are forged. We are the only licensees, and all parties are cautioned against using either of the dies or the forging mechanism or processes so protected, as our rights under said patents will be fully maintained.

While we can furnish either the Concave Shoe with One Calk, or the Flat Shoe with Two Calks, we emphatically recommend the Concave, with one Calk, for the following reasons, viz.:
First.—Because the entire bearing of the shoe should come upon the shell of the hoof, and not upon the ball or tender part of the foot, as is necessarily the case with the flat shoe. This principle is recognized by all experts in the shoeing both of oxen and horses, and will prevent a tendency to sore-footedness.
Second.—Because by having one Calk only, the shoe can be cut off or lengthened and fitted more perfectly to the foot.
Third.—Because by having one Calk only, the shoe can make the other Calk at any angle he desires.

No. 1. Full Length, Concave, 5 inches, Weight, per Set of Eight Shoes, 3 pounds.
" 2. " " " " " " " 3 1/2 " "
" 3. " " " " " " " 3 1/2 " "
" 4. " " " " " " " 3 1/2 " "
Packed in boxes or kegs of 100 pounds, half each rights and lefts. Full weight, and no charge for packages.

—PRICES.—
For orders of One Ton, or more, 9 cts. per pound. For orders of 500 lbs., or more, 10 cts. per pound.
" 1000 lbs. " 9 1/2 " " " " " " less than 500 lbs., 10 1/2 "

Terms, Net Cash, 30 days. Made only by

MILLERS FALLS CO.,
74 CHAMBERS ST., NEW YORK.

CHAMPLAIN
Forged Horse Nails.
MANUFACTURED BY THE
NATIONAL HORSE NAIL CO.,
Vergennes, Vermont.
HOT FORGED AND COLD HAMMERED POINTED. MADE OF BEST
NORWAY IRON AND WARRANTED.
WAREHOUSE
97 CHAMBERS AND 81 READE STREETS NEW YORK.
J. C. McCARTY & CO. Sole Agents.

H. B. SEIDEL, President. W. HASTINGS, Vice-Pres. and Gen'l Mgr. E. T. CANBY, Sec. and Treas.
THE SEIDEL & HASTINGS CO.
WILMINGTON, DELAWARE,
New York Office, No. 221 Pearl, Corner Platt Street,
MANUFACTURERS OF

BEST CHARCOAL
BOILER PLATES,
AND PLATE IRON GENERALLY.
ALSO BEST QUALITY HOMOGENEOUS STEEL PLATES.

We ask the special attention of the trade to our C. H. No. 1 Boiler Plates, which we manufacture expressly for the Shells of Steam Boilers and stamp 50,000 pounds T. S. when desired. One hundred and sixteen tests of this iron, made during the last three years by the U. S. Inspectors of Steam Vessels, show an average tensile strength of 58,508 pounds to the sectional square inch, and an average reduction of area of the fractured section of 30% per centum. Our prices are as low as the production of a good article will admit of.

POTTSVILLE IRON & STEEL CO.,
POTTSVILLE, PA., Manufacturers of all kinds of
STRUCTURAL STEEL AND IRON,
Viz., Beams, Channels, Tees, Angles, Plates and Bars; also
Steel and Iron Axles for Freight and Passenger Cars.

This Steel is manufactured by the CLAPP-GRIFFITHS process, and is specially adapted, in addition to the above, for Boiler and Bridge Rivets, Wire Rods, Nail Plates, &c. &c. Our Mild Steel is well adapted for use in place of the best quality of Wrought Iron; where a greater strength and ductility is required, it welds readily as Iron. Also Billets, Slabs of all sizes and any desired temper. Shipment of all sizes in stock, from which prompt shipments can be made.

Brewery, Malt and Ice House Construction a Specialty.

STRONGEST ACME WRENCH AND BEST



ALL STEEL CASE-HARDENED JAWS. WARRANTED. MANUFACTURED BY
OWSLEY BROS. & MARBLE, 784 to 794 Madison St., CHICAGO, U. S. A.
Description and Price List Furnished upon Application.

PURE TURKISH EMERY.
WALPOLE EMERY MILLS,
South Walpole, Mass.

Hardware Novelties.

Adjustable Screwless Door Knobs.

We illustrate herewith a new door knob which has recently been put on the market by the Nimick & Brittan Mfg. Co., Pittsburgh, Pa. It is the invention of their superintendent, Philip Mathes. This knob is designed to dispense with screws in the neck of the knob by the use of a screw spindle at one end, the knob at the other end being fastened permanently to the spindle. As indicated in the cut, the knob is screwed on the spindle and stopped wherever desired by a small nut lock which fits into a thimble. This thimble adjusts



Adjustable Screwless Door Knobs.

the knob to the thickness of door and fits into the rose on the door. The company claim that this knob is susceptible of the most perfect adjustment of any knob yet made, and mention the following advantages connected with its use: That there are no screws in the shank; that it will not become loose in any ordinary usage; that there is perfect adjustment to the thickness of the door, and that it is easily applied. It may be added with reference to its application to the door that the carpenter screws the thimble tight into the rose, thereby holding the rose in place until he has screwed it on the door. He then loosens the thimble to give free play to the latch of the lock, and finally runs the knob on the screw spindle as tight as possible. The company are manufacturing any of their bronze, bronze-plated or bronze-shank knobs with this screw spindle.

Walker's Standard Wrenches.

The Walker Wrench Co., 90 Chambers street, New York, are putting on the market a new wrench, which is shown in the accompanying illustration, Fig. 1. It is named Walker's Standard Wrench, and in connection with it has pipe attachments and a pipe cutter. The form of the wrench is indicated in the illustration, with some of its special features. In alluding to it the manufacturers call attention to the fact that these wrenches are more uniformly in proportion for excessive strain, and have larger openings than others, a 12-inch wrench hav-

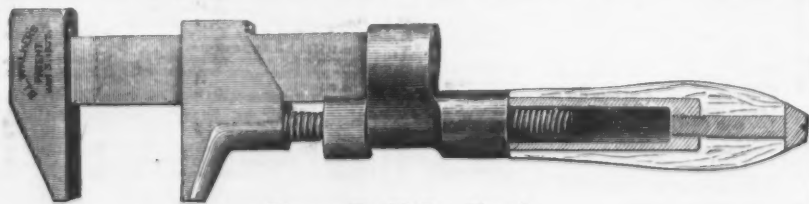


Fig. 1.—The Walker Wrench.

ing an opening equal to 15-inch of other makes. They make the point also that the cross strain is very light, the tension or pull coming directly in line with the bearing, while the offset in the handle gives additional leverage, and does away with the danger attending the top pull with other wrenches now in use. These wrenches are made bright and black, in 6, 8, 10, 12 and 15 inch sizes, and are put on the market with special claims as to quality in the confidence

that they meet the demand of the trade for a superior article of this character. In connection with the wrench is the pipe attachment shown in Fig. 2, made, as indicated, of two pieces, and readily applied. This attachment is described as made of the best steel, as not liable to cut the



Fig. 2.—Pipe Attachment.

pipe, as coming cheaper than any combined tool in the market, and as being adjustable from nothing to the extent of the opening of the jaws of the wrench. The principle of the attachment is that the bevel runs one way and the teeth the other, making a fulcrum of the jaw. It is made in 10, 12, 15, 18, 21, 24 and 30 inch sizes.

The pipe cutter is illustrated in Fig. 3. In this attachment, the cutter being bevel with the pipe cuts through it, instead of the old style of the crushing strain. It leaves no burr to be filed down, but instead a

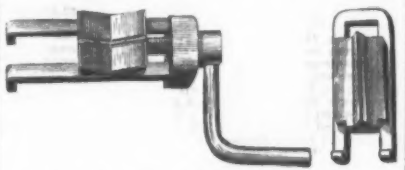


Fig. 3.—Pipe-Cutter Attachment.

beveled edge on the pipe, which is alluded to as assisting the workman in threading, and it is stated that the cutter will cut within $\frac{1}{8}$ -inch of the edge. The wrench and pipe attachment are already on the market, and the pipe-cutter attachment will be in a very short time.

Myers' Patent Steel Track.

F. E. Myers & Bro., Ashland, Ohio, are making a steel track or way for use in connection with hay carriers. Fig. 1 represents

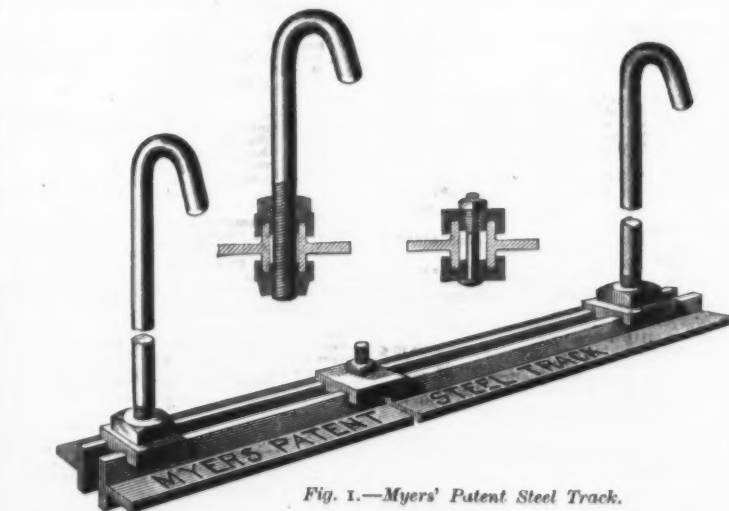


Fig. 1.—Myers' Patent Steel Track.

the construction of the track, which is made, as shown, by placing two T steel rails together, held in place by the clamps and hanging hooks, with space between, so that the hanging hook can be placed where it

resents their new reversible carrier, adapted to run on their patent T-rail steel track. The carrier, it will be observed, is constructed with flanged wheels, and has the same double lock trip and stop as their wide track reversible carrier, well-known to the trade.

MANUFACTURING.

Iron and Steel.

The Stony Creek (plate) Rolling Mill, at Norristown, Pa., is offered for sale.

Shoenberger & Co., of Pittsburgh, are preparing to erect two large heating furnaces to heat ingots made in their Bessemer plant.

James P. Witherow, of Pittsburgh, has contracted to erect for the Spang Steel and Iron Co. a two-converter Clapp Griffiths steel plant, with all the latest appliances. It will have a capacity of 200 tons per day and will be completed about the 1st of next October. The building to contain the new plant will be built of iron and will be 120 x 70 feet. It will adjoin the present mill and is designed to handle the material from the cupola to the blooming rolls direct and with hydraulic power. The steel will be rolled into bridge, structural and boiler-tube forms.

Mr. J. L. Pfau, Jr., secretary and manager of the Aetna Iron and Steel Works, of Quincy, Ill., informs us that the new works which they are erecting at Crown Point, Ind., are about completed. The machinery will be placed in the works at an early date. From present indications they will commence operations about June 15 next. The main office will be located on Washington street, Chicago.

The Spaulding Iron Co., at Brilliant, Ohio, closed down their nail factory for a few days last week to line up their roll train, and not on account of a lack of orders, as has been erroneously stated.

M. V. Smith, of Pittsburgh, is at present engaged in constructing his modified Siemens regenerative gas furnaces for the following firms: Tredegar Iron Co., Chattanooga, Tenn.; Tredegar Co., Richmond, Va.; Portland Rolling Mill, Portland, Me.; Western Nail Co., Belleville, Ill.; Standard Iron Co.,

Works to the new furnace which that firm is erecting on Second avenue. Mr. B. F. Jones in an interview stated that they had not decided when the work would be commenced, but that it would hardly be started this year on account of the present labor troubles.

The blast furnace of the Sharon Iron Co. at Sharon, Pa., was put in blast on the 17th inst. It had been idle for several months, during which it was put in complete order.

No. 5 Furnace of the Crane Iron Co., at Catasauqua, Pa., was blown out for repairs.

Contracts for the machinery of the Columbia Iron and Steel Co.'s steel plant and rolling mills have been made. Messrs. Edward P. Allis & Co., of Milwaukee, Wis., are building the engines, which are of the following sizes: Blowing engines for the steel plant, steam cylinders 32 x 60 inches, blowing cylinders 48 x 60 inches; one pair of 28 x 48 inch engines for blooming mill; one 40 x 60 inch engine for 26 inch mill; one 28 x 48 inch engine for 16-inch mill. The Lewis Foundry and Machine Co., Pittsburgh, are making the hydraulic cranes and blooming-mill shears, capable of cutting blooms from 7 to 20 inches, hot. They are also building a 16-inch three-high mill and hydraulic accumulators. Totten & Co., Pittsburgh, are building the 26-inch three-high mills, 34-inch blooming mill, ore crusher and ganister mill, and J. P. Witherow, Pittsburgh, is building the converters, ladles, &c. D. W. C. Carroll & Co., Pittsburgh, are building 20 steel boilers, each 60 inches in diameter by 16 feet long, having 40 4-inch tubes and two 8-foot cupolas, &c. The contract for the residue of the machinery is being made, and calls for the machinery to be made and set during the month of July.

Messrs. R. Hare Powell's Sons & Co., of Huntingdon, Pa., have broken ground for a new furnace.

The Pottsville Iron and Steel Co. have recently put in two new Clapp Griffiths converters, with a capacity of 100 tons finished steel per day. The steel is of a mild character, shows great ductility and strength and is suitable for all purposes, as it can be either blacksmith or welded. At present the company are busy on beams, angles, plates and bars, chiefly for bridge work, which is one of their specialties. They also manufacture axles for freight and passenger cars, and all kinds of iron and steel shapes required for architectural purposes.

The contract for the 8-inch and 10-inch iron pipe for the Ohio Gas Fuel Co., to be laid from the Pennsylvania State line to Youngstown, Ohio, has been awarded to the American Tube and Iron Co., of Middletown, Pa., and New York City, who are now building a large plant at Youngstown for the manufacture of wrought-iron pipe. Delivery of the line in question to the gas company is to commence early in June, and a large force of men will be put to work laying the two mains for as rapid completion as possible.

Machinery.

H. K. Porter & Co., locomotive builders, of Pittsburgh, shipped two locomotives to Savannah, Ga., on the 22d inst. The Pittsburgh Locomotive Works, Allegheny, have also large orders on hand for engines to go South.

The Brown Hoisting and Conveying Machine Co., of Cleveland, have recently sold a cable tramway plant, 375-foot span, to go to the Gogebic mining district. The plant is to be used on the Aurora Mining Co.'s property to strip the vein. The excavation required is 18 feet in depth, 150 feet in width and 600 feet in length.

The machine shops in New York City that have granted nine hours as a day's work are the Progress Steam Engine Works, the Edison Machine Co., R. Hoe & Co., Robert Deely & Co., Paul Prybil, Benjamin Fox, Wright Walters, Bergman & Co., Marvin Safe Co., Rilling & Schock, Alonzo E. Conover, the Jackson Architectural Works, Conover's Foundry, Slater & Reed, Sargent & Cullingworth, Baker & Smith, De La-vergne Ice Machine Co. and the Delamater Iron Works. In Brooklyn the Lidgerwood Steam Engine Works, the Pioneer Iron Works and Alsacen & Courfoot have wheeled into line, and in Jersey City Kilby & Jones, Theodore Smith and McWilliams & Brown.

Referring to our notice in last week's issue concerning Messrs. Light & Kriebel, of Morristown, Pa., starting in the general machinery business, we are in receipt of a letter from them in which among other things they say: "We inclose you our circular, which will rectify a small error. Our title is the Globe Steam Heater Co. We build the Globe heater, which is our own design and invention, and our time will be entirely devoted to its manufacture. We also act as agents for manufacturers of first-class steam engines, steam boilers, steam pumps and machinery of all kinds. Our Mr. Kriebel is the inventor of the Kriebel engine, the Progress automatic engine, the Kriebel submerged tubular boiler, Standard and Globe steam heaters and the Standard shaft coupling, all of which have met with great success in the market."

Fay & Scott, founders and machinists, of Dexter, Me., are at work on a lot of improved planer centers. They are also turning out a gauge lathe for fine work. It is a wood lathe for turning duplicate pieces to a pattern. The firm are driven with work, but the labor troubles have practically stopped their Western orders. Most of their work now comes from their own State.

The order for 29 pairs of vertical engines recently given to Anderson, Porter & Boyd, of Allegheny City, Pa., by the Tarentum Plate Glass Co., of Tarentum, Pa., and referred to in our columns at the time, is understood to be the largest order for machinery ever given in Allegheny County at one time. Sixteen pairs of engines have already been finished. The others are rapidly approaching completion.

The Hartford Tool Co., Hartford, Conn., inform us that they have sold their entire business to the Pratt & Whitney Co., of that city. Referring to the sale the Pratt & Whitney Co. have issued a notice in which they say that they shall continue the manu-

facture and sale of the threading, turning, shaping cutting-off and boring tools, center reamers, dividers, &c., hitherto made by the Hartford Tool Co., under the supervision of Mr. J. E. Woodbridge, the late manager of that company. Mr. Woodbridge has been for several years connected with the Pratt & Whitney Co. as contractor in their tap and die department.

The partnership heretofore existing between Cavett & McKnight, machine builders of Pittsburgh, was dissolved on the 17th inst., Wharton McKnight having purchased the interest of his former partner, Wm. K. Cavett. Mr. McKnight will continue the business at No. 44 Penn avenue.

The Dickinson Mfg. Co., of Scranton, Pa., have established a branch office and warehouse at 96 Lake street, Chicago, Ill., under the management of Mr. H. O. Nourse. A full line of samples of their specialties will be kept at the Chicago branch, and every facility will be offered to the trade that could be obtained in ordering direct from the works.

Harmon, Gibbs & Co., Corry, Pa., have contracted for the erection of a foundry addition to their engine and oil-well supply works. The building will be 110 x 45. This move was necessitated by their rapidly growing business.

The United States Car and Axle Lubricating Co., capital stock \$500,000, have been incorporated at Covington, Ky., by Charles P. Holmes, A. E. Heighway, Jr., Halden Davis and Charles T. Mills, to manufacture and sell railroad supplies and appliances.

The machinery and entire plant of the Reaser Valve Mfg. Co., Chicago, Ill., have been sold to Warren Springer.

The Shepard Mfg. Co., of Union City, Conn., have completed their factory and are now putting in machinery for building their pumps, compound steam engines, &c.

John Add & Son, machinery builders, of New Haven, Conn., announce that they will remove about June 1, 1886, to their new factory, corner State and Mill River streets.

McKinley & Spotswood, of Cincinnati, Ohio, are building a new hot-air engine, which from all accounts is meeting with considerable favor. It is known as the McKinley engine, and seems to offer special advantages as a domestic motor.

Hardware.

The Old Colony Iron Co. have closed their shovel factory at Taunton, Mass., for the present. The rumor that the factory will be moved to Somerset, we are advised, is incorrect.

John Bellamy, West Newton, Mass., has obtained a patent for an improved knob attachment. The object of his invention is the production of a simple knob-shank which when secured in position in the lock will not rattle, and is not affected by the swelling or shrinking of the door, and so constructed as to possess other advantages.

The Duggan Parker Hardware Co., St. Louis, Mo., are still working largely on contracts placed some time ago for builders' hardware.

The Gunn Hardware Co. were organized at Grand Rapids, Mich., last week with a capital of \$100,000. W. S. Gunn is president of the new concern.

Reed & Prince, Worcester, Mass., have commenced the manufacture in that city of iron rivets and burrs. They are referred to as having had long practical experience, and starting with new tools and machinery, and giving their personal supervision to all the details of the business, they claim to be in a position to furnish first-class goods and place them on the market in a presentable manner.

Miscellaneous.

Señor Don Ramon de Ybarola, a commissioner connected with the engineering department of the Mexican Government, is in Pittsburgh making the final negotiations with the Keystone Bridge Co. for the removal of their pavilion from the New Orleans Exposition grounds to the City of Mexico. The pavilion was built as a receptacle for the Mexican exhibits by the Keystone Co. at a cost of \$50,000, and the Mexicans are about to remove it to their capital for a public building or pleasure resort.

The Michigan Car Works, at Detroit, Mich., have 600 men at work, and announce that they will take back all the old force excepting those who were conspicuous in the strike.

The Buffalo Register Works, of Buffalo, N. Y., have removed from Perry street to their new plant, 430 to 436 Niagara street. The present establishment is upon a lot 200 feet front on Niagara street and extends to Seventh street, a depth of 90 feet. The building is of brick, three stories and basement, 88 x 40. Basement and first floor are devoted to the manufacture of warm air registers and ventilators. The second and third floors are equipped with machinery and tools for the manufacture of refrigerator locks and trimmings and special varieties of hardware. A portion of the second floor is used for office purposes. A Rice automatic engine is employed to furnish the power.

The Excelsior Glass Works, at Pittsburgh, resumed operations on the 24th inst., after an idleness of some weeks.

Application has been made for a charter for the Beaver Falls (Pa.) and the New Brighton (Pa.) Electric Light Co. for supplying New Brighton and Beaver Falls with light, heat and power by means of electricity. The incorporators are Julius F. Kurtz, H. W. Hartman, D. McKinney, Jr., J. F. Mines and James B. Oliver. The plant is expected to be in operation by the latter part of this summer.

The Central Connellsville Coke Co. were chartered at Harrisburg on the 20th inst., with a capital of \$600,000. The principal office will be at Tarr's Station, Westmoreland County, with a branch office in Pittsburgh.

The Southern Natural Gas Co., of Washington, Pa., with a capital stock of \$100,000, were chartered at Harrisburg, on the 20th inst.

The St. Louis Malleable Iron Co., who have been closed down for several months, will open again to-day.

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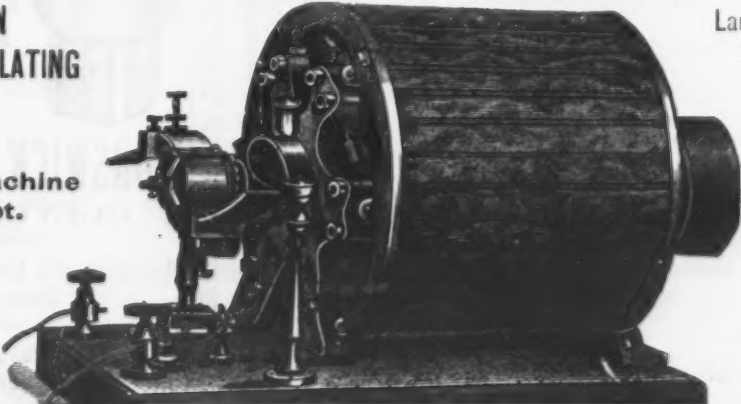
Nickel-Plating and Polishing Materials.

SOLE MANUFACTURERS OF

THE AMERICAN
DYNAMO ELECTRO-PLATING
MACHINE.

Best Plating Machine
in the Market.

HEADQUARTERS FOR
EVERYTHING
IN THE PLATING AND
POLISHING LINE.



Established 1863. Incorporated 1881.

THE
Largest Manufacturers
IN THE WORLD OF

Nickel Anodes,
Nickel Salts,
Patent Muslin Buffs,
Polishing Lathes,
Polishing Felt,
Polishing Rouges,
Pol'ng Compositions,
Walrus Leather,
Wood Emery Wheels,
Platers' Brushes,
&c., &c., &c.

WORKS OFFICES:

Zucker & Levett Chemical Co., 538 to 564 W. 16th St., 36 to 40 11th Ave., NEW YORK, U. S. A.

WHOLESALE METAL PRICES, May 26, 1886.

ESTABLISHED 1853.

METALS.

IRON.—Duty: Bars, 8-10¢ to 11-10¢; provided that no Bar Iron shall pay a less rate of duty than 35¢. Sheet, 11-10¢ to 15-10¢. Band, Hoop and Scrolled, 15-10¢ to 14-10¢. Railroad Bars weighing more than 25 lb. yard, 7-10¢ to 14-10¢.

Standard American Pig Iron.

Foundry No. 1, X..... 18.50
Foundry No. 2, X..... 17.00
Gray Forge..... 16.00

No. 1 Scotch Pig Iron.

Carnbroe..... 18.50
Coltess..... 18.50
Shotts..... 18.50
Langarock..... 19.00
Gartbarrie..... 19.50
Langloan..... 20.00
Summerlee..... 20.00
Dalmellington..... 18.50
Edlington..... 18.50
Clyde..... 18.50

Rails.

Steel, at Eastern mills..... 34.50 to 35.00
Old Rails, Ts..... 19.50 to 20.00

Scrap.

Wrought, 7 ton, from yard..... 19.50 to 20.00

Bar Iron from Store.

Common Iron, 10 lb. round and square..... 1.75 to 1.80
Refined Iron, 10 lb. round and square..... 1.90 to 2.00

1 to 2 in. round and square..... 1.90 to 2.00
1 to 2 in. square and 3-16..... 2.10 to 2.20
Rods, 1/2 and 1-1/2 round and square..... 2.20 to 2.30

1 to 2 in. round and square..... 2.20 to 2.30
1 to 2 in. square and 3-16..... 2.40 to 2.50
Rods, 1/2 and 1-1/2 round and square..... 2.50 to 2.60

1 to 2 in. round and square..... 2.50 to 2.60
1 to 2 in. square and 3-16..... 2.70 to 2.80
Rods, 1/2 and 1-1/2 round and square..... 2.80 to 2.90

Sheet Iron from Store.

Common American..... 3.50
Cleaned..... 3.75

Nos. 10 to 16..... 3.75 to 4.00
17 to 24..... 4.00 to 4.25
25 to 30..... 4.25 to 4.50

31 to 36..... 4.50 to 4.75
37 to 42..... 4.75 to 5.00
43 to 48..... 5.00 to 5.25

49 to 54..... 5.25 to 5.50
55 to 60..... 5.50 to 5.75
61 to 66..... 5.75 to 6.00

67 to 72..... 6.00 to 6.25
73 to 78..... 6.25 to 6.50
79 to 84..... 6.50 to 6.75

85 to 90..... 6.75 to 7.00
91 to 96..... 7.00 to 7.25
97 to 102..... 7.25 to 7.50

103 to 108..... 7.50 to 7.75
109 to 114..... 7.75 to 8.00
115 to 120..... 8.00 to 8.25

121 to 126..... 8.25 to 8.50
127 to 132..... 8.50 to 8.75
133 to 138..... 8.75 to 9.00

139 to 144..... 9.00 to 9.25
145 to 150..... 9.25 to 9.50
151 to 156..... 9.50 to 9.75

157 to 162..... 9.75 to 10.00
163 to 168..... 10.00 to 10.25
169 to 174..... 10.25 to 10.50

175 to 180..... 10.50 to 10.75
181 to 186..... 10.75 to 11.00
187 to 192..... 11.00 to 11.25

193 to 198..... 11.25 to 11.50
199 to 204..... 11.50 to 11.75
205 to 210..... 11.75 to 12.00

211 to 216..... 12.00 to 12.25
217 to 222..... 12.25 to 12.50
223 to 228..... 12.50 to 12.75

229 to 234..... 12.75 to 13.00
235 to 240..... 13.00 to 13.25
241 to 246..... 13.25 to 13.50

247 to 252..... 13.50 to 13.75
253 to 258..... 13.75 to 14.00
259 to 264..... 14.00 to 14.25

265 to 270..... 14.25 to 14.50
271 to 276..... 14.50 to 14.75
277 to 282..... 14.75 to 15.00

283 to 288..... 15.00 to 15.25
289 to 294..... 15.25 to 15.50
295 to 300..... 15.50 to 15.75

301 to 306..... 15.75 to 16.00
307 to 312..... 16.00 to 16.25
313 to 318..... 16.25 to 16.50

319 to 324..... 16.50 to 16.75
325 to 330..... 16.75 to 17.00
331 to 336..... 17.00 to 17.25

337 to 342..... 17.25 to 17.50
343 to 348..... 17.50 to 17.75
349 to 354..... 17.75 to 18.00

355 to 360..... 18.00 to 18.25
361 to 366..... 18.25 to 18.50
367 to 372..... 18.50 to 18.75

373 to 378..... 18.75 to 19.00
379 to 384..... 19.00 to 19.25
385 to 390..... 19.25 to 19.50

391 to 396..... 19.50 to 19.75
397 to 402..... 19.75 to 20.00
403 to 408..... 20.00 to 20.25

409 to 414..... 20.25 to 20.50
415 to 420..... 20.50 to 20.75
421 to 426..... 20.75 to 21.00

427 to 432..... 21.00 to 21.25
433 to 438..... 21.25 to 21.50
439 to 444..... 21.50 to 21.75

445 to 450..... 21.75 to 22.00
451 to 456..... 22.00 to 22.25
457 to 462..... 22.25 to 22.50

463 to 468..... 22.50 to 22.75
469 to 474..... 22.75 to 23.00
475 to 480..... 23.00 to 23.25

481 to 486..... 23.25 to 23.50
487 to 492..... 23.50 to 23.75
493 to 498..... 23.75 to 24.00

499 to 504..... 24.00 to 24.25
505 to 510..... 24.25 to 24.50
511 to 516..... 24.50 to 24.75

517 to 522..... 24.75 to 25.00
523 to 528..... 25.00 to 25.25
529 to 534..... 25.25 to 25.50

535 to 540..... 25.50 to 25.75
541 to 546..... 25.75 to 26.00
547 to 552..... 26.00 to 26.25

553 to 558..... 26.25 to 26.50
559 to 564..... 26.50 to 26.75
565 to 570..... 26.75 to 27.00

571 to 576..... 27.00 to 27.25
577 to 582..... 27.25 to 27.50
583 to 588..... 27.50 to 27.75

589 to 594..... 27.75 to 28.00
595 to 600..... 28.00 to 28.25
601 to 606..... 28.25 to 28.50

607 to 612..... 28.50 to 28.75
613 to 618..... 28.75 to 29.00
619 to 624..... 29.00 to 29.25

625 to 630..... 29.25 to 29.50
631 to 636..... 29.50 to 29.75
637 to 642..... 29.75 to 30.00

643 to 648..... 30.00 to 30.25
649 to 654..... 30.25 to 30.50
655 to 660..... 30.50 to 30.75

661 to 666..... 30.75 to 31.00
667 to 672..... 31.00 to 31.25
673 to 678..... 31.25 to 31.50

679 to 684..... 31.50 to 31.75
685 to 690..... 31.75 to 32.00
691 to 696..... 32.00 to 32.25

697 to 702..... 32.25 to 32.50
703 to 708..... 32.50 to 32.75
709 to 714..... 32.75 to 33.00

715 to 720..... 33.00 to 33.25
721 to 726..... 33.25 to 33.50
727 to 732..... 33.50 to 33.75

733 to 738..... 33.75 to 34.00
739 to 744..... 34.00 to 34.25
745 to 750..... 34.25 to 34.50

751 to 756..... 34.50 to 34.75
757 to 762..... 34.75 to 35.00
763 to 768..... 35.00 to 35.25

769 to 774..... 35.25 to 35.50
775 to 780..... 35.50 to 35.75
781 to 786..... 35.75 to 36.00

787 to 792..... 36.00 to 36.25
793 to 798..... 36.25 to 36.50
799 to 804..... 36.50 to 36.75

805 to 810..... 36.75 to 37.00
811 to 816..... 37.00 to 37.25
817 to 822..... 37.25 to 37.50

823 to 828..... 37.50 to 37.75
829 to 834..... 37.75 to 38.00
835 to 840..... 38.00 to 38.25

841 to 846..... 38.25 to 38.50
847 to 852..... 38.50 to 38.75
853 to 858..... 38.75 to 39.00

859 to 864..... 39.00 to 39.25
865 to 870..... 39.25 to 39.50
871 to 876..... 39.50 to 39.75

877 to 882..... 39.75 to 40.00
883 to 888..... 40.00 to 40.25
889 to 894..... 40.25 to 40.50

LEAD.—Duty: Pig, \$2 50 100 lb.; Old Lead, 2¢
D: Pipe and Sheet, 3¢ 50 lb.

Pig..... 5¢ 50 lb.
Bar..... 5¢ 50 lb.
Pipe..... 6¢ 50 lb.

Block Tin Pipe..... 40¢
Tin Lined Pipe..... 15¢ 50 lb.
Sheet..... 7¢ 50 lb.

Shot, 1/2 bag, 25 lb..... Drop, \$1.46; Buck, \$1.70
Chilled Shot, 1/2 bag, 25 lb..... \$1.70

ANTIMONY.
Bailett..... 9¢ 50 lb.
Cookson..... 9¢ 50 lb.

SPELTER.—Duty: Pigs, Bars and Plates, \$1.50
100 lbs.
American, cash..... 45¢ 50 lb.

ZINC.—Duty: Pig or Block, \$1.50 100 lbs.
Sheet, 24¢ 50 lb.
600 lb. cases..... 5.50 to 5.70

Zinc—Open..... 64¢ 50 lb.
Zinc Tubing..... 20¢ 10 lb.

Zinc Tubing.—Dis. 25¢
Plain..... 27¢
Fancy..... 33¢

SCOTCH METAL.
N. P. U..... 10¢ 50 lb.
X..... 15¢ 50 lb.

WIRE.
Market Wire, Put up in 63 lb. bundles.
Nos. 10 to 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

Black Paint, in oil..... kegs, 8¢; assorted cans, 11¢
Blue, Prussian, fair to best..... 40¢ 55¢
Chinese dry..... 15¢ 30¢
Van Dyke..... 15¢ 30¢
Brown, Spanish..... 15¢ 30¢
Dyers, Patent American..... 15¢ 30¢
Green Chrome..... 15

MECHANICAL.

Jacker's Chain Rolling Machine.

As chains are to day and have been made for ages, the links are bent into each other and welded singly. Welding iron is a process which is far more difficult than generally understood, and to make a good chain, with every link perfectly welded, requires a great deal of experience and not less skill. If, therefore, chains can be manufactured of iron without welding, by a process of squeezing, stamping or rolling, a product of uniform strength will be the result, without requiring any particular skill of the operator. The idea of rolling or squeezing chains out of a solid bar has probably occurred to many, but has been re-

tween them in such shape that the links may be easily separated from the weak connecting parts by tumbling the blanks in a rotating cylinder, which, besides breaking the connecting webs, will finish the connecting links of the chain and polish them, as metallic shot and other articles are finished and polished. It will be seen that the links as thus formed will be all integral or a part of the original blank, and will require no welding.

We have before us a sample of lead chain made by a model of the machine, together with piece of the blank, as shown in Fig. 3. The lead chain issuing from the machine has a thin fin between the links, which can be removed by simply rubbing the chain between the fingers. Iron or steel chains made in this way will show a similar fin or scale, which cannot be rubbed off with the fingers,

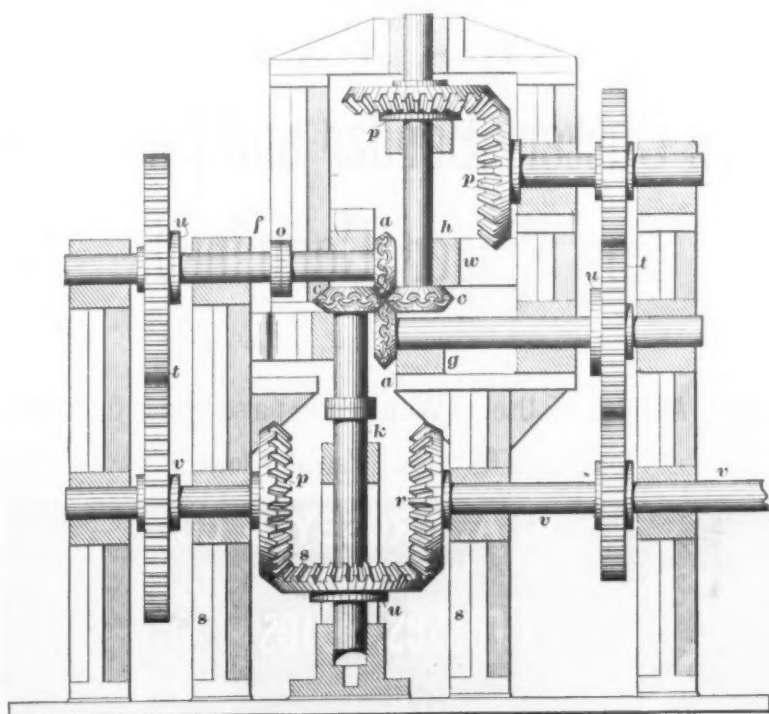


Fig. 1.—Section and Elevation.

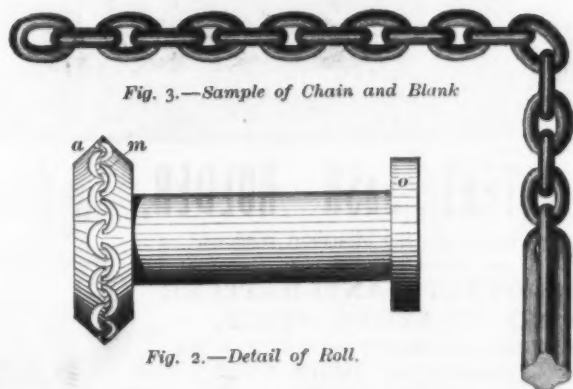


Fig. 3.—Sample of Chain and Blank

JACKER'S CHAIN ROLLING MACHINE.

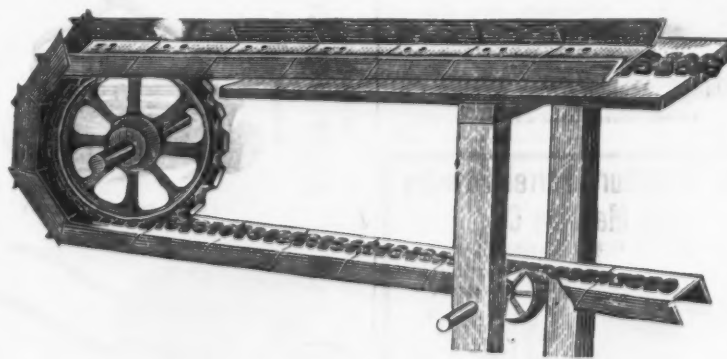
jected as impracticable. Mr. M. Jacker, of the M. C. Bullock Mfg. Co., of Chicago, Ill., has, however, designed a machine which seems to meet the requirements of practical working in this line, and embodies a number of interesting and novel features. Concerning the rolling process the designer says: "Let us place the links of the chain in such a position that they are not in contact, dividing the spaces between iron and iron equally. We can now readily perceive that it is quite feasible to mold and cast a chain in a four-parted flask by merely giving a little clearance somewhere, which will not perceptibly alter the shape or appearance of the chain. We can now understand how a piece of chain may be squeezed out of a bar of iron in an analogous manner by means of four converging dies without difficulty. It will, however, not be so easy to produce a continuous chain in this way. But let us place four rolls in such a position and let their outsides be of such a shape as to take the place of the dies. We have then only to form the dies, distributed in equal divisions all around the rolls, give the proper clearance so as to allow the material to leave the matrix freely as the rolls revolve, and the solution of the problem is a fact which has been demonstrated. The manner of making the rolls for different sizes and shapes of chains, the best way of arranging the necessary gearing, the preparatory rolling of bars to the most suitable shape, manner of feeding bars to rolls and other necessary details are mere matters of mechanical construction and present no appreciable difficulty to mechanical ingenuity."

Mr. Jacker's machine is shown in section in Fig. 1 of our illustrations. The letters a c indicate a series of four die-rollers which are set in planes at right angles to each other, and mounted upon shafts f g h k, journaled in suitable bearings in the frame of the machine. These rollers are beveled at their peripheries, as shown. From Fig. 2, which represents a detail view of one of the rolls, it will be observed that the peripheries of the rollers at their adjoining beveled edges have formed in them semicircular recesses, m, which act as dies in the formation of the chain. The shafts f g h k p r s, and the cog-wheels and pinions t u, connect with the main driving shaft v by means of intergearing wheels, by which they are all driven in unison, so as to bring the dies together in proper relative positions to swage the links of the chain. A rotary movement is imparted to the rollers by power applied to the shaft f. The blank is fed in between the rollers at the front of the machine, and is carried forward between them automatically. In passing between the rollers the dies on their beveled peripheries partially press or swage out the links alternately at right angles to each other, leaving the pressed blank after passing be-

but by counter-cutting the rolls can be made so thin that its removal by tumbling will present no difficulty. The bar in passing through the rolls is stretched to about twice its original length. For small chains the matrices must be milled into the rollers, while for heavy chains the rolls are cast in chills. Mr. Jacker informs us that the manufactured chain only will probably be put on the market.

Endless Trough Conveyor.

The endless trough conveyor shown in the annexed cut is one of the many uses to which roller chain is applied with great success. Anti-friction roller chain is so constructed that the chain is carried upon its rollers, which serve as trucks, instead of



ENDLESS TROUGH CONVEYER.

Made by the Roller Chain Belting Co., Columbus, Ohio.

dragging, thus requiring but little power to drive it. Endless trough conveyor chains consist wholly of flat or "D" attachments, which form a solid floor for the trough to rest upon, and to which they are bolted, each trough having but one fastening, to allow them to pass over the sprocket-wheels. The troughs are so arranged on the chain that they overlap, and in passing over the sprocket-wheels, at the point of discharge, do not separate, but are always connected, so that there is no possibility of their becoming entangled, nor to allow the contents to fall upon the wheels. This forms an endless open trough which runs upon a plane provided for the purpose, and may be run at an incline. The conveyor, on its return, is carried back by means of iron or wooden pulleys, used as idler-wheels, upon which the inside or bottom of the trough rests. Conveyers of this class can be made of either single or double strands of chain, according to the size of trough and capacity re-

quired, which is unlimited. The conveyor, being constructed entirely of iron, is fire-proof, and is well adapted to carry hot ores, coal, coke, stone, &c. It is made by the Roller Chain Belting Co., of Columbus, Ohio.

Novelties in Locomotive Practice.

One of the recent novelties in locomotive construction is to be found in the design of M. Estrade, which he proposed to try on the southern lines in France. M. Estrade, in fact, has not confined himself to the locomotive, but has also designed a complete system of rolling stock for a passenger train, which has been exhibited in model form at the Conservatoire des Arts et Métiers, and will shortly be put to the practical test. Convinced of the value of large wheels, M. Estrade fits not only his locomotive, but also the tender and coaches with wheels $8\frac{1}{2}$ feet in diameter. His locomotive is of the outside cylinder type, with slide-valve on the top of cylinder, and all the gear carried outside, according to the general plan on the Continent. The six wheels of $8\frac{1}{2}$ feet diameter are coupled and placed as close together as possible, as will be seen from the following table of dimensions, which will be studied with curiosity, if not with interest:

Total length.....	88 feet
Width between longitudinals.....	4 feet
Diameter of wheels.....	$8\frac{1}{2}$ feet
Distance between axles, rear to middle.....	$8\frac{1}{2}$ feet
Distance between axles, middle to leading.....	$8\frac{1}{2}$ feet
Cylinders.....	18 $\frac{1}{2}$ inches
stroke.....	27 $\frac{1}{2}$ inches
from axis to axis.....	6 $\frac{1}{2}$ feet
Grate surface.....	24 $\frac{1}{2}$ sq. feet
Heating surface.....	1,408 sq. ft.
Capacity of boiler.....	144 cubic ft.
Weight of engine, empty.....	38 tons
Weight of engine, loaded.....	42 tons

It is calculated that this engine will be capable of maintaining speeds of 72 to 78 miles an hour. The tender has wheels $8\frac{1}{2}$ feet in diameter, and is arranged to carry as much water and coal as possible, but otherwise presents no features of novelty. The coaches are peculiar in that they are carried inside iron girders, while the wheels run under the center of the longitudinal seats. Two axles, 16 feet apart, support, through elliptic springs mounted upon the oil-boxes, these longitudinal girders, which have ends curving toward the ground. Each girder carries three other elliptic springs, from which is suspended, by means of iron rods, the lower frame on which the body of the car is supported. The coach is separated into two stories, the lower of which is made in three pendent sections with doors, which may be used as baggage rooms, &c. Above is a single compartment with central passageway, reached by stairways at each end of the coach, and communicating with the other portions of the train by hinged platforms.

Another novelty is the compound engine of Mr. Von Borries, which is employed on the Hanoverian section of the Prussian State Railways, and which is especially notable for the starting-valve. The locomotive has four coupled wheels 6 feet 1 inch in diameter, and two leading wheels 3 feet 8 $\frac{1}{2}$ inches in diameter. The centers of the leading and middle (technically trailing) wheels are 9 feet 2 $\frac{1}{2}$ inches apart, and between these are carried the cylinders, close to the middle wheels and with all gear outside. The cylinders are respectively 16 $\frac{1}{2}$ inches and 23 $\frac{1}{2}$ inches in diameter, with a stroke of nearly 23 inches. The boiler does not call for special notice, but the weight of the engine roadworthy is about 37 $\frac{1}{2}$ tons. The receiver is placed beneath the boiler between the two cylinders, and Mr. Von Borries's starting-valve is located on the side where the receiver is connected to the valve-chamber of the low-pressure cylinder. The starting-valve is shut by the driver when he wishes to start, and it blocks the passage through the receiver from the high to the low pressure cylinder. While the valve is in that position steam can flow from the boiler to the low-pressure cylinder through a pipe and connections, in which it is so throttled as to equalize the steam pressure on the larger area of the low-pressure piston. The engine having thus been put into motion, the exhaust from the high-pressure cylinder passes into the re-

ceiver, but cannot pass to the other cylinder, because the way is blocked by the starting-valve. The pressure accordingly accumulates in the receiver until it is sufficient to force the starting-valve back against the pressure of the throttled steam supplied direct from the boiler to the other side of the valve, when the engine at once commences to work compound. The starting-valve is, we believe, arranged to work automatically, so that all the driver has to do is to open the regulator in the ordinary way, and the engine will start, as boiler steam is supplied to both cylinders. Compounds of Mr. Von Borries's make have been working for the last five years, and it is stated, with a fuel economy of from 10 to 20 per cent. over engines of the same weight and performing similar duties.

Harrison's chemical works in Philadelphia were partially destroyed by fire; estimated loss, \$75,000.

THE WEEK.

Minneapolis, Minn., is the largest flour-producing city in the world, having an aggregate of 23 mills, with a daily capacity for the manufacture of 32,825 barrels of flour. The total amount of flour made in 1885 was 5,100,962 barrels, of which 4,850,962 were shipped to market.

The textile manufacturers of Philadelphia, representing \$150,000,000 capital, have formed an association for the establishment of fair and uniform wages, the prevention of strikes, the settlement of differences between employers and operatives and the protection of the members from worthless and incompetent operatives.

The scheme for bridging the Hudson at Storm King is revived and the engineers have resumed operations. The Erie Railway Co. are apparently co-operating.

The new Canadian Pacific bridge near Lachine is being pushed rapidly to completion. The iron part of the structure is from the works of the Dominion Bridge Co., near by. Twelve caissons for the piers will inclose the foundations, and automatic dredges will work inside down to the rock.

Private steam yachting is more than ever popular, and the desire to attain high speed is expected to develop new appliances in steam navigation.

De Soto, Mo., will become almost extinct as the result of removing the shops of the Pacific Railroad to some point where property is more secure. The pay-rolls amounted to \$50,000 monthly.

Daniel Bray, a dyer, of Philadelphia, has commenced a suit in the Court of Common Pleas against the Knights of Labor, whom he charges with having banded together "to annoy, intimidate and interfere with the people employed by him, and prevent others who seek to enter into employment with deponent."

A new building for the Metropolitan Telephone and Telegraph Co., to be erected in Cortlandt street, near Broadway, will be fire-proof and cost \$200,000.

Judge James C. Spencer was elected president of the Aqueduct Commission, which will spend \$40,000,000 of the people's money.

Cattle grazing in Montana and Dakota gains steadily in importance. At Spring Dale, Mon., is the ranch of C. B. Menderhall, of Illinois, who has an immense range 200 miles back from the river, and the herd of cattle consists of 13,000 head. The sales this year of stock will amount to \$100,000. The Marquis Demoris, at Medora, is erecting large sheds now for 7000 head, and will make the experiment this winter which will enable him to continue slaughtering and shipping during the winter season. More attention than ever is being paid by ranchmen to the improvement and better grading of their herds, and large shipments are being made into the Territories from the States of fine blooded cattle.

Miners in Montana are making large shipments of ore over the Northern Pacific Railroad to the Eastern States for smelting, the miners claiming that the Eastern smelters give them a much better yield than the smelters of their own territory. After paying the transportation, which amounts to \$250 per car, there is still left a good profit to the miners.

The Illinois corn crop for 1885 was nearly 231,000,000 bushels. May 1st inst. 57,000,000 bushels of old corn were still in the producers' hands, against about 50,000,000 a year ago.

Mrs. Alexander, of this city, who owns Keely motor stock and wants her dividends, is making trouble in the Boreel Building.

A terrible drought prevails in three counties in Southwestern Texas, comprising an area equal to the State of Maine, where there has been no rain for 18 months. On one ranch out of 6000 cattle one half died, and on another 3000 sheep, strewn the prairie with putrid carcasses.

Repairs to American vessels, when made in Canada, are not entitled to the rebate of duties prescribed by Section 3114 of the Revised Statutes, unless it is made to appear by satisfactory evidence that the vessel, while in the regular course of her voyage, was compelled, by stress of weather or other casualty, to put into a Canadian port to make such repairs, and that the repairs were necessary to enable her to continue her voyage in safety.

Accounts from the lumber regions are generally favorable. Shipments opened briskly at Ottawa, May 1, 10,000,000 feet clearing for Montreal, 500,000 for Quebec, 5,393,000 feet for Burlington and Whitehall, 900,000 for New York, and 1,000,000 for Kingston—total, 18,000,000. The lumber traffic in the Chippewa, St. Croix and Black River districts shows more signs of improvement than at any time since the close of the sawing season. As showing the wonderful changes in the lumber business, brought about by improved transportation and the development of new fields of operation, it is stated that the prices of high-grade pine lumber are lower to day than they were 35 years ago. At Chicago the outlook is quite cheerful, now that the deadlock since May 1 has been broken. The

product of the Saginaw region for the present season will be less than 700,000,000 feet, rather than above that amount.

Medals for ingeniously-constructed machines were awarded to four boys in Grammar School No. 57 by the school trustees.

The United States Senate passed, by a large majority, the bill to grant permission to construct a railroad bridge across the Arthur Kill, at Staten Island, with an amendment authorizing the Secretary of War to compel the bridge to be remodeled or removed if interfering with commerce.

Further details are received respecting the great aerolite found in Washington County, Pa., by Professor Emerick, of William and Mary College. It was buried in the earth and weighed about 200 tons. As already stated, an analysis showed that besides chromium, nickel, aluminium, copper, magnesium, tin and other metals and metalloids, there enter into its composition 87 per cent. of iron which may be readily worked. The aerolite also contains a substance called "schreibersite," a composition which has never been found except in aerolites. Its specific gravity is 7.412, about twice that of the Gurnsey, Ohio, aerolite, which fell on the 1st of May, 1860. Professor Emerick is much elated with having found the greatest aerolite known, and has preserved a number of the largest and finest specimens.

The Glendale coal breaker near Scranton, Pa., was struck by lightning and burnt; loss, \$35,000.

The settlement of custom-house disputes, as provided for in an old law, has long been neglected, but the whole matter being incorporated in Section 2931 of the Revised Statutes, the Collector at New York has been instructed by the Secretary of the Treasury to inquire into and decide the amount of duties to be paid where protests have been filed, instead of forwarding the complaints to Washington. The Treasury Department can be appealed to as a last resort.

The new Fire Department Headquarters, on Sixty-seventh street, near Third avenue, are near completion, and with the high mansard roof and tower terminating 160 feet above the street form an imposing edifice. The main entrance has four Scotch granite columns, and aside from a granite balcony at the third story the front has no special ornamentation. The Fire Commissioners and Building Bureau occupy the third and fourth stories. The entire cost will be about \$160,000.

The National Board of Fire Underwriters during the last year secured 15 convictions for incendiarism, paying therefor seven rewards amounting to \$2500.

Work at the metal shops in Chicago was resumed on the ten-hour basis.

In the Edison machine works, in this city, 450 men went out on a strike. The superintendent says ten hours' pay for eight hours' work was agreed to, also double pay for overtime, but when it came to employing only union men they refused, because a good workman met all the conditions. Contracts for the purchase of iron and copper have been stopped after making satisfactory arrangements.

Three new steamers for the coasting trade will be built by the New York, Philadelphia and Norfolk Railroad Co.

The city of Albany celebrates its bi centennial with a population of about 100,000.

The Ways and Means Committee is still discussing the majority and minority reports on the bill to carry the Mexican treaty into effect, and will be ready to report probably about the middle of June, the majority being adverse to the bill.

A reporter, in looking over the mortgages recorded during the past week, found that a leading life insurance company had loaned the sum of \$150,000, due January 1, 1888, on west side property, with the stipulation "gold" attached, and it is said that among real-estate dealers the disposition to insist on the gold clause is becoming more general as to the payment of mortgages.

The receipts of grain in New York for April, as shown by the monthly statement, were smaller than for any corresponding month on record. Wheat receipts were less than 4,000,000 bushels, or only 81,000 tons, against 186,000 tons in April, 1885.

As a model steamer the Louisiana, of Cromwell's New Orleans line, claims the first rank. With a given amount of fuel she combines speed and carrying capacity to a point nowhere surpassed, and for obvious reasons is carefully observed by builders, navigators and engineers.

While the Southern States are almost wholly exempt from labor troubles so common in the North, Professor Dodge, of the Agricultural Department, at Washington, shows how great is the indebtedness of the cotton-producing States and the weight of burden they carry in the form of interest and other charges. It is estimated from careful reports from agents specially charged with obtaining facts that the rate of interest and other charges paid is as follows: North Carolina is 25 per cent., including the advanced price of supplies furnished; of South Carolina, 15 per cent.; of Georgia, 50 per cent. in the price of advances and 10

WASHINGTON NEWS.

(From Our Regular Correspondent.)

WASHINGTON, D. C., May 25, 1886.

The House by a vote of 141 yeas to 84 nays having resolved itself into committee of the whole yesterday, the first bill on the calendar was House bill 7652, "to reduce tariff taxes and to modify the laws in relation to the collection of the revenue." There was an ominous silence for a time when the chairman made this announcement. Mr. Morrison took the floor, not to press the issue, but simply to ask that the bill be passed over. There was objection on the part of Mr. Dunham, who was anxious to make a test at once, but in this he was overruled, and the bill was passed over.

ORDNANCE AND WAR SHIPS.

The Cameron bills for the encouragement of the manufacture of steel for modern naval and army ordnance, armor shafting and other army and naval purposes, and to provide heavy ordnance adapted to modern army and navy warfare, have been reported back from the Committee on Coast Defenses with material amendments. The Secretaries of War and Navy are authorized to make contracts with responsible steel manufacturers, after suitable advertisements, for the supply of rough-bored, rough-turned and tempered steel suitable for the above purposes, in quantities not to exceed 10,000 tons for each branch of the service, to conform to specifications and to be subject to tests at each stage of manufacture.

In the execution of the terms of both bills they provide that no money shall be expended except in payment for steel accepted and delivered; that each bidder shall contract to erect in the United States a suitable plant, including the best modern appliances, capable of making all the steel required, and of finishing it, in accordance with the contract, and agree in the case of an ordnance contract to deliver yearly a specified quantity of each caliber, the time of delivery of the smaller calibers to commence at the expiration of not more than 18 months and that of the largest calibers at the expiration of not more than three years from the date of the acceptance of the contract; and that all the forgings shall be manufactured in the United States.

The bill authorizes the erection at the navy-yard at Washington, D. C., and Watervliet Arsenal, West Troy, N. Y., gun factories for finishing and assembling guns adapted to modern warfare, up to and including the largest approved sizes, and for the manufacture of gun carriages and ordnance equipment, not to exceed \$1,000,000.

The most important amendments to both bills is the designation of an appropriation of the sum of \$8,000,000 for the purposes of each act, to be available during six years, from January 1, 1887, or a total of \$16,000,000. This will carry the supply of the necessary funds with the passage of the bill, thus obviating any delay from that quarter.

Senator Cameron has given notification that he will press the Senate to an early consideration of these important measures, so that they may reach concurrent action before the adjournment of the present session of Congress.

THE REPORTS.

The report of the investigation by the House committee gives the information bearing upon the subject in the most satisfactory form, being concise and to the point. It shows that the companies visited are willing to undertake the operations provided they receive "sufficient remuneration." On the bases of contracts "sufficient remuneration" was stated as follows up to 16 inch 100-ton guns:

Bethlehem Iron Co., contract for 6000 tons a year for five years.

Tredegair Iron Co., 1000 to 2000 tons a year for "a long term of years."

Cambria Iron Co., 2000 tons a year for five years, for calibers up to 10-inch.

Midvale Steel Co., 3000 tons for one year for calibers up to 12 inches, a gross order of 5000 tons.

The figures show an average of about \$800 a ton.

The Midvale Co. are at present the only establishment furnishing the Government steel for ordnance up to tubes for 8-inch guns. Also parts for 5 and 6 inch guns, tubes for converting 10-inch smooth bores into 8 inch rifles, and hoops for a 12-inch cast-iron gun.

ARMOR PLATES.

It is shown that foreign armor 1 1/2 inches thick costs about \$300 per ton, and 20 inches thick \$500 per ton. An American firm stipulates for 5000 tons per year for five years at \$500 per ton, or \$12,500,000.

MARINE ENGINES AND WAR VESSELS.

It is shown that suitable marine engines can be built in the Boston, New York, Washington and Norfolk navy-yards, and in many private works. It is also shown that iron and steel war vessels can be built in several of the navy-yards and private establishments at present in operation in the United States.

NEW SHIPS.

The Committee on Naval Affairs have planned for the consideration of the new ships bill as soon as the oleomargarine and legislative appropriation bills are out of the way. There are several prior pending orders, which, however, are not expected to consume much time.

When a vote was taken on Tuesday in the Ways and Means Committee on the bill to carry the Mexican treaty into effect, all of the 13 members were present except Messrs. Reed and McMillan. Ten voted against the bill and only Mr. Hewitt for it. Mr. Maybury's adverse report was not fully concurred in by his associates, and is virtually his individual expression. Messrs. Maybury's and Hewitt's reports both review the history of the treaty. Mr. Maybury's report condemns the proposed introduction of sugar and tobacco free of duty as wholly objectionable and destructive to home indus-

tries. Mr. Hewitt's report is an admirable document, disposing quite conclusively of the arguments against the commercial wisdom and benefit of acceptance of the treaty, and reviewing the history and policy of commercial treaties and our relations with other American Governments in a most interesting manner.

Imports.

The following were the Imports of Hardware, Iron, Steel and Metals into the Port of New York for the week ending May 26, 1886:

Hardware.	Pig. tons, 100
Alexandre F. & Sons.	Wiley, J. F. & Co.
Mach'y, pkgs., 1	Old iron, tons, 90
Nails, chs., 2	Williamson Jas. & Co.
Box, 1	Tons, 100
Auffmordt C. A. & Co.	Order.
Mach'y, cs., 8	Old flange rails, 3063
Barbour Bros. & Co.	Pig. tons, 150
Mach'y, pkgs., 7	Spiegel, tons, 950
Beckel J. & Co.	Old tubes, tons, 5
Cases, 8	Wire net g. rolls, 258
Berbecer J. & Co.	Old rails, pcs., 1493
Nails, cs., 87	Rods, bdls., 16,879
Benbacher Daniel,	Hoop, bdls., 40
Iron screws, case, 1	Specular iron, tons,
Boker Hermann & Co.	380
Hardware, cutlery	Manganiferous iron,
and guns, pkgs., 50	tons, 40
Brown Bros. & Co.	Old iron, tons, 184
Cutlery, cs., 6	Ferromanganese,
Coombs, Crosby & Eddy,	chs., 119
Arms, cs., 34	
Curley J. & Bro.	
Cutlery, case, 1	
Downing, R. F. & Co.	
Cases, 4	
Field Alfred & Co.	
Cases, 2	
Dieckhoff, Roelfloer &	
Co.	
Cases, 10	
Drexel, Morgan & Co.	
Arms, cs., 9	
Folsom H. & D.	
Arms, cs., 5	
France & Co.	
Files, cases, 2	
Gurney Fred B.	
Cutlery, cs., 2	
Hartley & Graham,	
Arms, cs., 64	
Merch. Desp. Co.	
Arms, cs., 33	
Case, 1	
Newton & Shipman,	
Files, case, 1	
Pacific Mail S. S. Co.	
Force pump, 1	
Rauft Richard,	
Nails, cs., 50	
Rosenthal, J.	
Cases, 23	
Shoverling, Daly &	
Gales,	
Arms, cs., 2	
Squires H. C.	
Guns, case, 1	
Ward Asine,	
Mdse., cs., 6	
Weymouth Paper Co.	
Mach'y, case, 1	
Wiebusch & Hilger,	
Hardware, and cutlery,	
pkgs., 6	
Chains, cases, 12	
Chains, cs., 18	
Witte John G. & Bro.	
Cutlery, cs., 6	
Needles, cs., 2	
Order.	
Arms, cs., 50	
Ironware, bdls., 46	
Lifting jacks, cs., 2	
Cutlery, case, 1	
Cases, 6	
Mach'y, cs., 4	

Steel.	Pig. tons, 100
Abbott Jere & Co.	Wiley, J. F. & Co.
Wire, bdls., 415	Old iron, tons, 90
Cases, 14	Williamson Jas. & Co.
Baring Bros. & Co.	Tons, 100
Rods, bdls., 1684	Order.
Beicher, H. W.	Old flange rails, 3063
Pkgs., 8	Pig. tons, 150
Brown Bros. & Co.	Spiegel, tons, 950
Car wheel tires, 22	Old tubes, tons, 5
Boker Carl F.	Wire net g. rolls, 258
Cases, 28	Old rails, pcs., 1493
Cary & Moen,	Rods, bdls., 16,879
Rods, bdls., 2088	Hoop, bdls., 40
Curran, John,	Specular iron, tons,
Cases, 3	380
Bundles, 45	Manganiferous iron,
Downing, R. F. & Co.	tons, 40
Slabs, 280	Old iron, tons, 184
Meyer, Strouse & Co.	Ferromanganese,
Cases, 22	chs., 119
Mersick C. S. & Co.	
Cases, 7	
Newton & Shipman,	
Bundles, 25	
Bars, 12	
Cases, 8	
Pidditch, F. S.	
Packages, 136	
Rawlins, G. E.	
Cases, 53	
Wagner W. F.	
Cases, 12	
Bdls., 168	
Bars, 72	
Plates, 10	
Wright Peter & Co.	
Rods, bdls., 157	
Order.	
Cases, 3	
Tires, 25	
Crucible car wheel	
tires, 38	
Bars, 47	
Blooms, 998	
Rods, bdls., 1834	
Rods, 81	
Forgings, 38	
Hoops, bdls., 1000	
Strips, cases, 24	
Plates, 2	
Slabs, 194	
Leaf spring, tons, 62	
Bundles, 350	
Rods, coils, 11,029	
Cases, 16	

Iron.	Pig. tons, 100
Alexandre F. & Sons,	Wiley, J. F. & Co.
Bars, 10	Old iron, tons, 90
Bundles, 65	Williamson Jas. & Co.
Baring Bros. & Co.	Tons, 100
Rods, bdls., 4191	Order.
Wire rods, coils, 1006	Old flange rails, 3063
Bales, 144	Pig. tons, 150
Bars, 2566	Spiegel, tons, 950
Brown Bros. & Co.	Old tubes, tons, 5
Bdls., 600	Wire net g. rolls, 258
Byrne Jas. & Co.	Old rails, pcs., 1493
Tin plates, bxs., 200	Rods, bdls., 16,879
Canadian Bank of Com-	Hoop, bdls., 40
merce,	Specular iron, tons,
Tin plates, bxs., 1225	380
Crocker Bros.	Manganiferous iron,
Pig. tons, 300	tons, 40
Spiegel, tons, 312	Old iron, tons, 184
Curtis, R. J.	Ferromanganese,
Bdls., 40	chs., 119
Boxes, 158	
Coddington T. B. & Co.	
Sheets, bdls., 317	
Sheets, bxs., 16	
Davies, Turner & Co.	
Iron, case, 1	
Downing, R. F. & Co.	
Girders, 272	
Feuchtwanger & Co.	
Manganese ore, tons,	
238	
Jacobus E. J.	
Bars, 391	
Bdls., 40	
Rods, 12	
Johnson, J. S.	
Scrap, bdls., 16	
Lillenberg N.	
Wire rods, bdls., 43	
Naylor & Co.	
Wire, coils, 982	
Pig. tons, 510	
Newell Bros.	
Tin plates, bxs., 156	
Plock & Co.	
Bundles, 2286	
Pierson C. L.	
Pig. tons, 10	
Stetson Geo. W. & Co.	

Metals.	Pig. tons, 100
Baring Bros. & Co.	Wiley, J. F. & Co.
Tin plates, bxs., 707	Old iron, tons, 90
Boker Hermann & Co.	Williamson Jas. & Co.
Cartridges, cs., 10	Tons, 100
Brown Bros. & Co.	Order.
Tin plates, bxs., 283	Old flange rails, 3063
Bruce & Cook,	Pig. tons, 150
Black plates, bxs.,	Spiegel, tons, 950
122	Old tubes, tons, 5
Central Stamping Co.	Wire net g. rolls, 258
Tin plates, bxs., 1679	Old rails, pcs., 1493
Dickerson Van Dusen	Rods, bdls., 16,879
& Co.	Hoop, bdls., 40
Tin plates, &c., bxs.,	Specular iron, tons,
3079	380
Drexel & Co.	Manganiferous iron,
Tin plates, bxs., 450	tons, 40
Johnson J. S.	Old iron, tons, 184
Old metal, pkgs., 3	Ferromanganese,
Judson, F. H.	chs., 119
Filters, 171	
Marsching J. & Co.	
Metals, cs., 3	
Mersick C. S. & Co.	
Terne plates, bxs.,	
220	
Phelps, Dodge & Co.	
Tin plates, bxs.,	
19,357	
Tin ladders, bxs., 479	
Black ladders, 276	
Roche Jas. W.	
Old copper, bdls., 8	
Copper still, 1	
Strain L. & Sons,	
Metal ware, cs., 6	
Order.	
Tin ingots, 9577	
Lead, pigs, 1718	
Quicksilver, bottles,	
200	
Tin plates, bxs.,	
36,814	
Antimony, chs., 20	
Tin, boxes, 508	
Terne plates, bxs.,	
1100	

Quantity.	Value.
175	\$1,323
84	2,397
11	1,028
25	1,172
30	2,196
80	4,230
19	27,541
19	8,376
41	5,968
6	1,153
2,579	37,100
30	1,083
2,679	40,581
750	1,592
2,365	30,582
11,999	48,828
84	5,372
410	21,438
7	311
18	3,108
1	1,357
6	4,573
91	257
60,544	62,931
113,000	8,518
2,510	2,510
41,330	167,238
112,000	24,979
480	3,910

The importations at this port of Hardware, Cutlery and Metals during the week ending May 21 were as follows:

Quantity.	Value.
175	\$1,323
84	2,397
11	1,028
25	1,172
30	2,196
80	4,230
19	27,541
19	8,376
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60,544	62,931
113,000	8,518
2,510	2,510
41,330	167,238
112,000	24,979
480	3,910

May 25 was the third anniversary of the opening of the East River Bridge. During these three years 45,136,854 persons have crossed the structure, and have paid \$1,621,639.81 for the privilege. The increase in travel has been very steady.

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GARDEN CITY DOUBLE-ACTING SPRING BUTTS.

Manufactured by the CHICAGO SPRING BUTT CO., Chicago, Ill.

Send for New Illustrated Catalogue and Prices.

DOORS.	1 1/2 to 1 3/4 in.	1 3/4 to 2 in.	2 to 2 1/2 in.	2 1/2 to 3 in.	3 to 3 1/2 in.	3 1/2 to 4 in.	4 to 4 1/2 in.	4 1/2 to 5 in.	5 to 5 1/2 in.	5 1/2 to 6 in.
PER PAIR.	\$1.00	\$1.25	\$1.50	\$1.75	\$2.00	\$2.25	\$2.50	\$2.75	\$3.00	\$3.25
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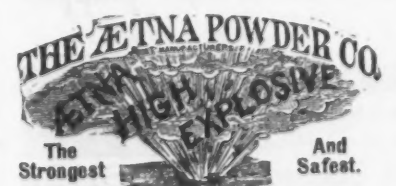
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The half-holiday bill in the New York Legislature was killed.

A railway committee from the Massachusetts Legislature on Friday tested the running qualities of the Sprague electric motor connecting the Third avenue railway with the Thirty-fourth Street Ferry. A speed of 15 miles an hour was attained, and stops were made without a jerking motion. The power for the motor is generated at the foot of Thirty-fourth street on the East River, and carried by wire to the third rail, into which are generated 600 volts strength. The current passes from the track to the motor, and is carried off through the axles and wheels to the running tracks.

It is said that Martin Irons "had a narrow escape from a mob of strikers" on Friday morning. He was afterward seen in Kansas City, and denied having fled from Sedalia or being in hiding. He said "he opposed the Missouri Pacific strike, and that his plan was to boycott the Texas Pacific, but he was overruled, and is now being made a scapegoat."

The Grand Jury at Hillsboro, Mo., have indicted 59 railroad strikers for conspiracy.

The strike for shorter days for labor in Chicago is practically a failure, with no better results than the derangement of business and the serious detriment of the workingman. The pecuniary loss to the majority of strikers is estimated at \$600,000 a week. The early indications in the building trades in Chicago encouraged an estimate of \$25,000,000 for this year's total building operations, but now this is believed to be at least one-third too high. The Boston Commercial Bulletin has been making inquiries among the architects of that city, and finds that the May strikes have had the effect of suspending investments aggregating \$4,000,000.

John McIntyre, of the Glasgow Iron Works, N. Y., has invented a marine governor, which consists of a float hung over the stern and connected with the steam-valve by a chain. When the bow of the vessel pitches into a sea the float falls and closes the valve.

Robert P. Porter was elected general secretary of the Protective Tariff League.

Advices from Portland, Me., and Boston state that one or more armed schooners have sailed for the Bay of Fundy and are prepared to resist capture by Canadian cruisers in case of dispute as to fishing rights. Under precisely analogous circumstances Secretary Marcy in 1853 wrote to the collector of Barnstable respecting certain irate fishermen, who had armed in self-defense: "You will warn them of the consequences of committing any unfriendly act during the progress of the pending negotiations, as any such act may postpone indefinitely the settlement of this vexatious question, and the result would be likely, in any event, to prove hazardous to themselves. Any armed resistance on the part of the fishing vessels, either singly or combined, would be an act of private hostility which can never receive any countenance from this Government."

The contract for building the new Harlem Bridge has not yet been awarded, although the bids were opened a month ago.

Judge Ignacio Supelveda, of the City of Mexico, who is now visiting the United States, expresses confidence in the stability of his Government and the efforts of President Diaz to bring about a healthy financial condition. The general desire is to encourage investments by citizens of the United States in manufacturing and other forms of enterprise. The values of property have increased greatly, due to the introduction of railroads and the working of mines by foreign capital. The judge affirms, contrary to report, that the Government has no disposition to interfere with private enterprise, tempted by a desire for gain. "It would be suicidal," he remarked, "to destroy the very element that gives them life." He believes the payment of subsidies to railway corporations, suspended last year, will soon be resumed.

The courts in Chicago and Milwaukee, in charging the grand jury, use vigorous language with reference to anarchists or rioters of whatever name. Judge Rodgers says: "We hear a good deal lately of what constitutes freedom of speech. There is no constitutional right for men to assemble and engage in wild harangues and incendiary speech. These men must be held responsible for what they incite others to do. That is the spirit of the law. If men are incited to riot, arson and other unlawful acts the men responsible for this may be held answer-

able for the results." Judge Mallory, at Milwaukee, is not less equivocal. After charging that those who incite to riot are guilty equally with those who actually participate in the commission of unlawful crimes, he says: "An agreement between two or more persons wrongfully to injure or prejudice a third person, or any body of men, as, for instance, a combination to injure a man in his trade or profession, is a conspiracy, and as such is an indictable offense. If, therefore, two or more persons conspire together for the purpose of boycotting a man with intent to injure or destroy his business, they may be indicted for a conspiracy. * * * A conspiracy to prevent, by means of threats or other unlawful means, an operative from obtaining employment in his business is indictable. It is also indictable to conspire to molest and obstruct with a view to induce to leave their employment, and any labor organization having for its object the accomplishment of such purpose by such means is unlawful."

Speaker Husted, of the New York Legislature, in his closing address claimed for that body the credit of initiating "the movement looking toward the future enlargement and deepening of the Erie Canal—a movement which will surely result not only in enabling that great waterway to continue to be, as it has ever been, the regulator of transportation rates, but which will restore to it its former proud position as the potent factor in the struggle for the carrying-trade of the West."

The free-ship proposition was discussed vigorously in the House of Representatives on Saturday, Mr. Dunn, of Arkansas, favoring and Mr. Dingley, of Maine, opposing. The latter said, with reference to the pending bill, that "if a fully-equipped British vessel should be admitted to register under American laws, then from that hour the shipbuilding industry was doomed and the owners of American shipyards, and the many thousand skilled workmen employed by them, would be irretrievably driven into what were already overcrowded industries. The bill should be entitled 'a bill to close American shipyards and provide for the construction hereafter, in British yards, of whatever vessels may be needed for the American merchant marine.' The trouble in competing on the sea with Great Britain did not arise from the first cost of the vessel. A vessel built on the Clyde was but 10 or 12 per cent. cheaper than that built in America. The great difference arose in the cost of sailing the vessel, growing entirely out of the higher wages and better food demanded on American vessels. A free-ship policy was an invitation not only to buy foreign ships, but also to sail under a British register after they were bought. Such a policy would serve to extinguish the commendable and indispensable patriotic instinct which led Americans to look upon American built and registered ships as representing the power, the ambition, the wealth, the prestige, the prosperity and the civilization of the United States. A navy was but the offspring of a great merchant marine, built in home shipyards. Navies rose and fell with the merchant marine; and the policy which the United States should follow was to give every possible aid and encouragement to the establishment of great shipyards."

Receiver O'Brien has commenced proceedings to take formal possession of the Broadway Surface Railroad. He proposes that the company shall name the amount of compensation to be paid him for a further use of the property. In default of such action he will apply to the court for such orders as shall enforce his authority.

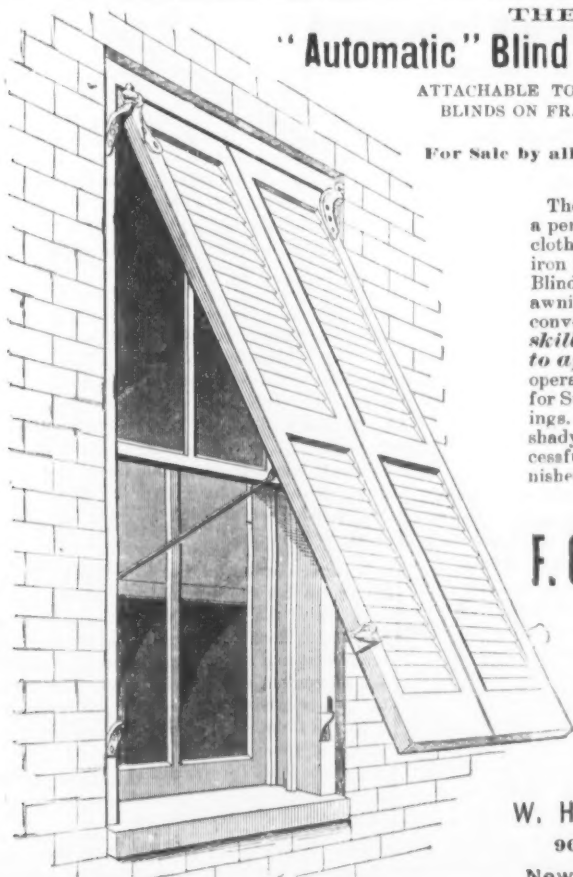
Heavy orders for new locomotives are being executed in the Baldwin and Pittsburgh Locomotive Works for Southern railroads, where a change of gauge, May 30, makes necessary expenditures estimated to equal \$3,000,000.

Total product of Cleveland Iron Mine, Marquette County, since opening in 1850, 3,192,638 tons. The greatest yield was in 1884, 224,479 tons.

Buddensiek, of "mud-mortar" fame, is carrying on extensive building operations in this city, despite the fact that he was sentenced a year ago to 10 years' imprisonment for manslaughter. Legal quibbles account for it.

The Panama Canal was discussed at length in a Cabinet council, which finally decided to authorize the Panama Co. to issue a loan of 600,000,000 francs in shares, provided the company are able to prove that this sum is sufficient to complete the canal. The company, on the other hand, have decided to postpone the execution of all work not absolutely indispensable to the opening of the canal to traffic, and thereby fulfil the conditions required by the Government.

The Canadian fishery protection fleet, comprising one steamer and six fast-sailing schooners, will be fully equipped before the end of the present week and form a complete defense of the coast from the Bay of Fundy to the Gulf of St. Lawrence. Up to the present time the Canadians have seized two vessels and the United States authorities one. The latter is for alleged infraction of the revenue laws, and in its spirit is supposed to be retaliatory. Secretary Bayard intimates that his duties pertaining to this subject are not neglected, of which official information will be given in due time.



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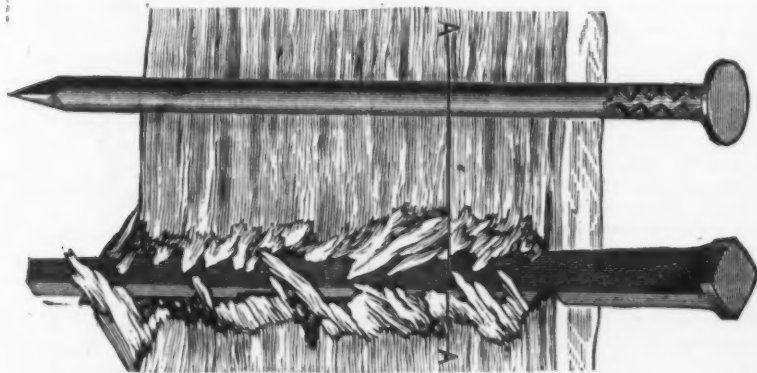
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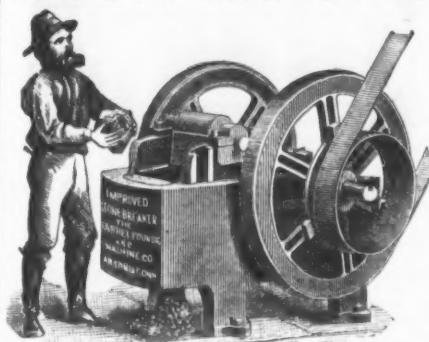
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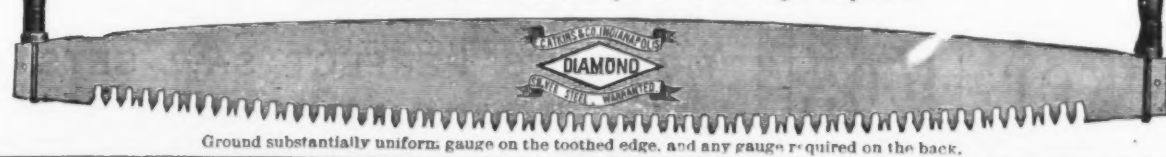
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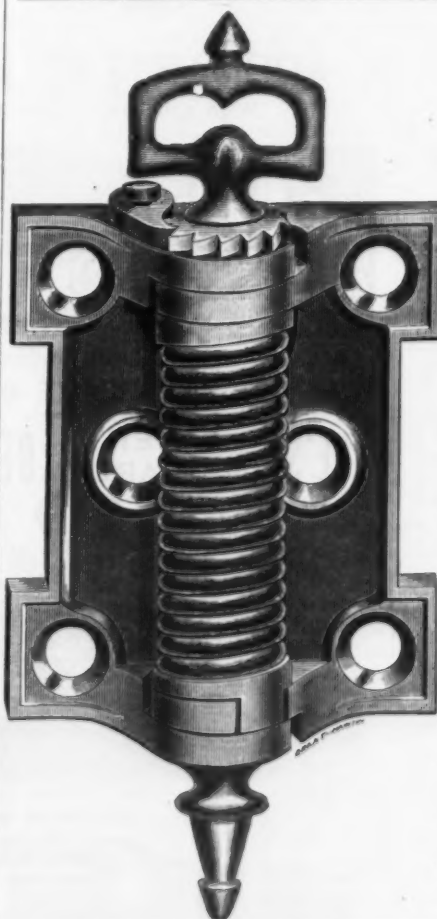
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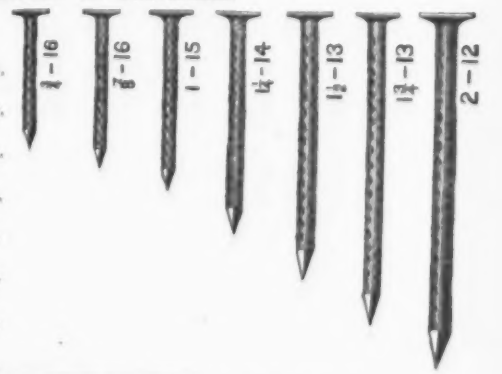
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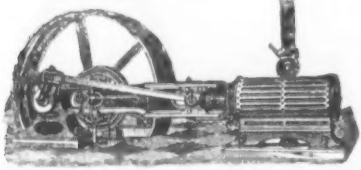


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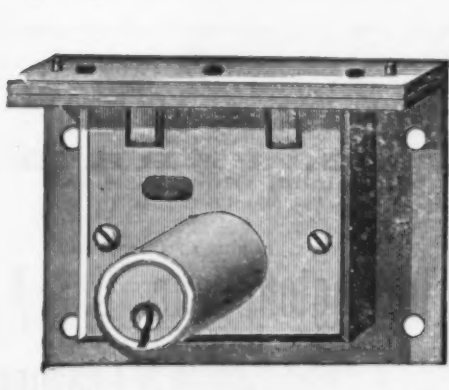
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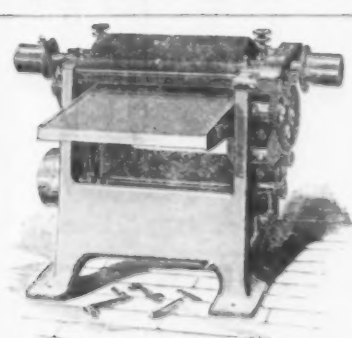
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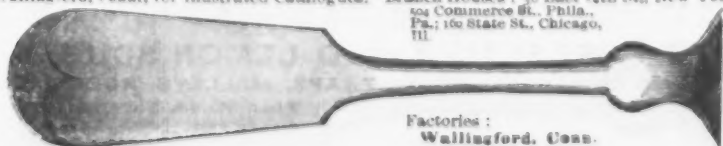
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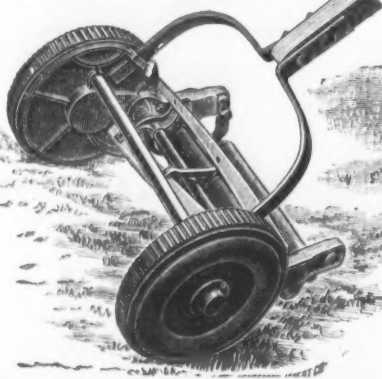
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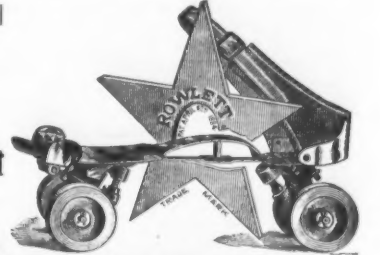
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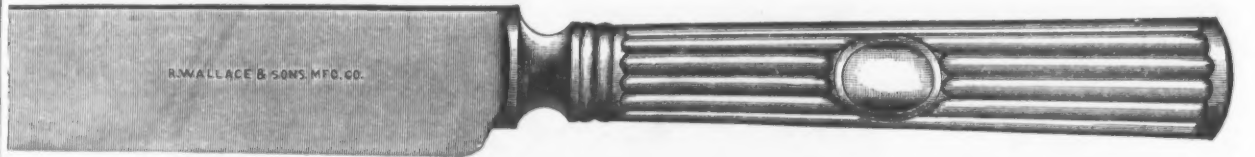
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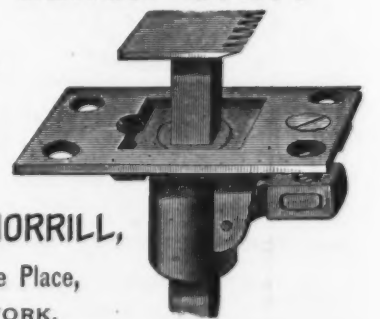
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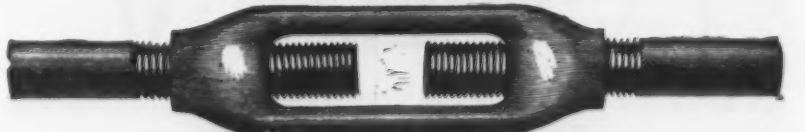
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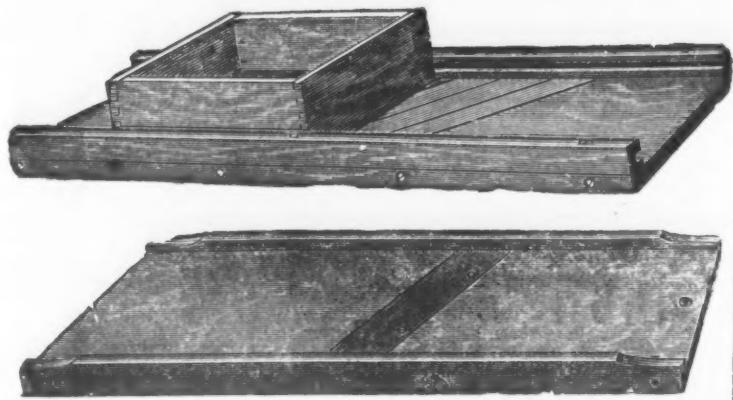
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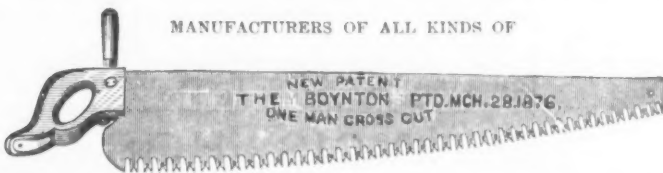
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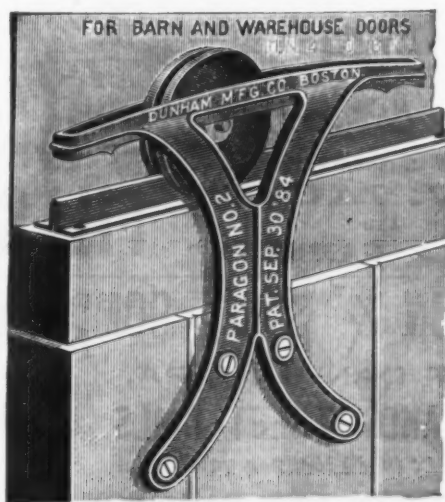
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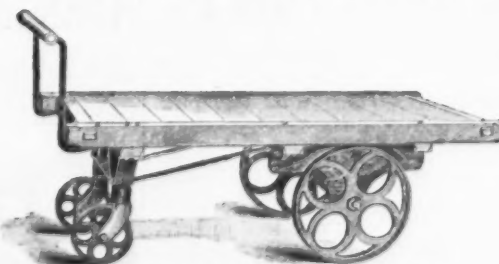
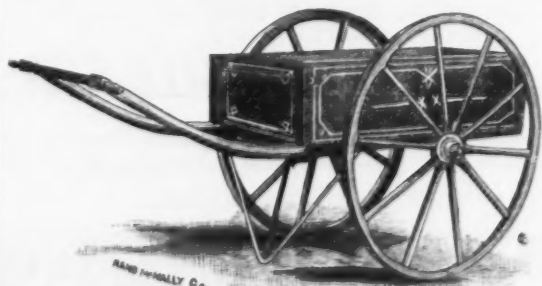
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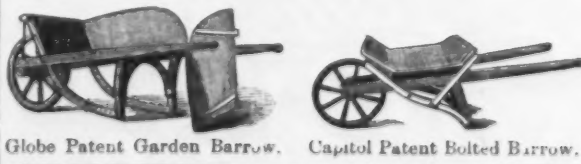
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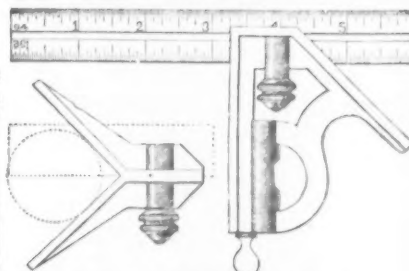
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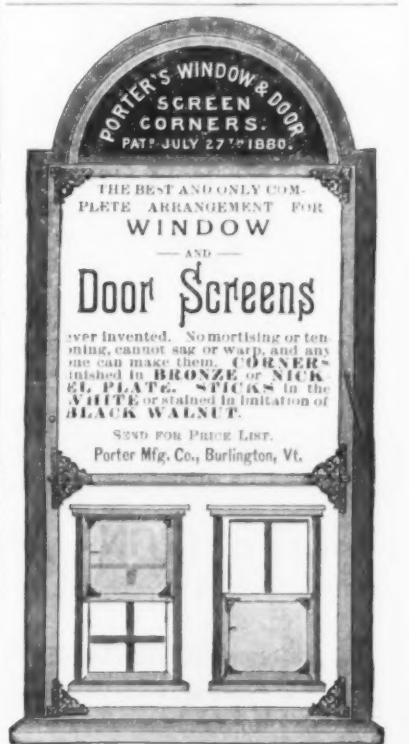
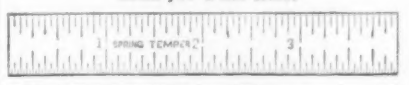
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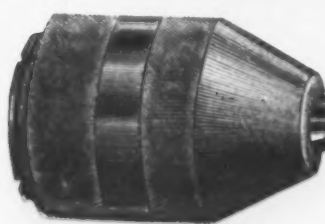
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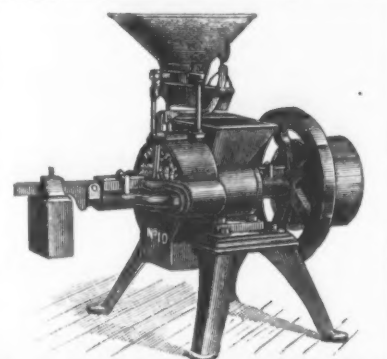
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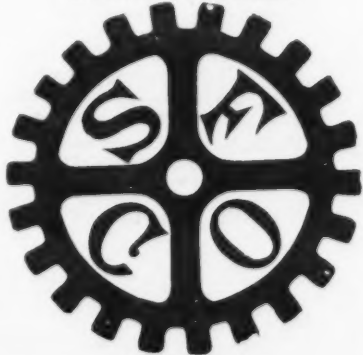
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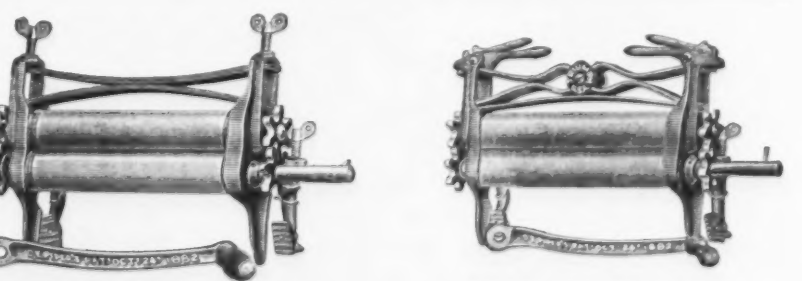
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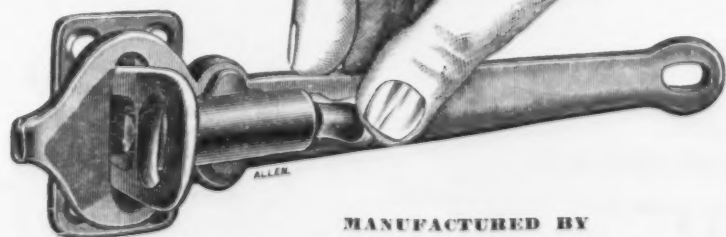
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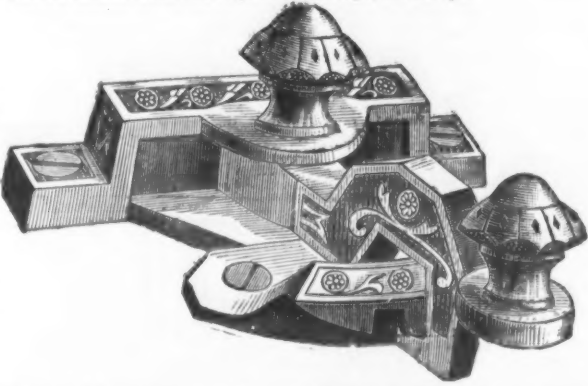
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Jennings' Auger Bits, new list Jan. 1, 1884, 25c	25
Cook's Auger Bits and Augers	45c to 55c
Snell's Ship Augers	dis. 15 to 20
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Bonney's Pat. Hot Augers, list \$48 9/10 doz. 40c	40
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Light Hand Bells	dis. 75 to 10
Swiss Pattern Hand Bells	dis. 15 to 20
Connell's Door Bells	dis. 20 to 25
W. Western & Kentucky Cow, new list	dis. 70
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Upright, without Augers	dis. 50
Angular, without Augers	dis. 50
Bolts. —Eastern Carriage Bolts, new list June 10, 1884.	
Phila. Carriage Bolt, new list Jan. 1, 1884, 25c	25
Stanley Wrought Shutter	dis. 60c to 10c
Braces. —Barner's Improved.	
Barber's Old Style	dis. 50
Backus, Polished	dis. 60c to 10c
Backus, Nickel	dis. 60c to 10c
Spofford	dis. 60c to 10c
American Bell	dis. 55 to 10
Amidon Improved	dis. 60c to 10c
Amidon Corner Brace	dis. 40c to 10c
Butts.	
Cast Butt Joint, Narrow	dis. 60
Cast Butt Joint, Broad	dis. 60
Cast Loose Joint, Narrow	dis. 60 to 10
Cast Loose Joint, Broad	dis. 60 to 10
Cast Acorn, Loose Pin	dis. 70 to 70c to 10
Cast Acorn, Japanned	dis. 60
Cast Mayer's Loose Joint	dis. 60
Wrought Loose Pin	dis. 65c
Wrought Table Hinges and Back Flaps	dis. 60c
Wrought Loose Joint	dis. 60c
Wrought Narrow Butt	dis. 65
Blind Butts.	
Parker	dis. 75c
Clark	dis. 75c to 10c
Shepard	dis. 75c to 10c
Lull & Porter	dis. 75c to 10c
Huffer's	dis. 75c to 10c
Casters. —Bed (new list July 1, 1886) Plate.	
Chains, German Halter and Coll. list June 1, 1884	dis. 55c to 10c
Galvanized Pump	dis. 55c to 10c
Best Proof Coll. Chain—English.	dis. 55c to 10c
3-16 5/16 3/4 1 1 1/2 1 3/4 2 2 1/2 3 3 1/2 4 4 1/2 5 5 1/2 6 6 1/2 7 7 1/2 8 8 1/2 9 9 1/2 10 10 1/2 11 11 1/2 12 12 1/2 13 13 1/2 14 14 1/2 15 15 1/2 16 16 1/2 17 17 1/2 18 18 1/2 19 19 1/2 20 20 1/2 21 21 1/2 22 22 1/2 23 23 1/2 24 24 1/2 25 25 1/2 26 26 1/2 27 27 1/2 28 28 1/2 29 29 1/2 30 30 1/2 31 31 1/2 32 32 1/2 33 33 1/2 34 34 1/2 35 35 1/2 36 36 1/2 37 37 1/2 38 38 1/2 39 39 1/2 40 40 1/2 41 41 1/2 42 42 1/2 43 43 1/2 44 44 1/2 45 45 1/2 46 46 1/2 47 47 1/2 48 48 1/2 49 49 1/2 50 50 1/2 51 51 1/2 52 52 1/2 53 53 1/2 54 54 1/2 55 55 1/2 56 56 1/2 57 57 1/2 58 58 1/2 59 59 1/2 60 60 1/2 61 61 1/2 62 62 1/2 63 63 1/2 64 64 1/2 65 65 1/2 66 66 1/2 67 67 1/2 68 68 1/2 69 69 1/2 70 70 1/2 71 71 1/2 72 72 1/2 73 73 1/2 74 74 1/2 75 75 1/2 76 76 1/2 77 77 1/2 78 78 1/2 79 79 1/2 80 80 1/2 81 81 1/2 82 82 1/2 83 83 1/2 84 84 1/2 85 85 1/2 86 86 1/2 87 87 1/2 88 88 1/2 89 89 1/2 90 90 1/2 91 91 1/2 92 92 1/2 93 93 1/2 94 94 1/2 95 95 1/2 96 96 1/2 97 97 1/2 98 98 1/2 99 99 1/2 100 100 1/2 101 101 1/2 102 102 1/2 103 103 1/2 104 104 1/2 105 105 1/2 106 106 1/2 107 107 1/2 108 108 1/2 109 109 1/2 110 110 1/2 111 111 1/2 112 112 1/2 113 113 1/2 114 114 1/2 115 115 1/2 116 116 1/2 117 117 1/2 118 118 1/2 119 119 1/2 120 120 1/2 121 121 1/2 122 122 1/2 123 123 1/2 124 124 1/2 125 125 1/2 126 126 1/2 127 127 1/2 128 128 1/2 129 129 1/2 130 130 1/2 131 131 1/2 132 132 1/2 133 133 1/2 134 134 1/2 135 135 1/2 136 136 1/2 137 137 1/2 138 138 1/2 139 139 1/2 140 140 1/2 141 141 1/2 142 142 1/2 143 143 1/2 144 144 1/2 145 145 1/2 146 146 1/2 147 147 1/2 148 148 1/2 149 149 1/2 150 150 1/2 151 151 1/2 152 152 1/2 153 153 1/2 154 154 1/2 155 155 1/2 156 156 1/2 157 157 1/2 158 158 1/2 159 159 1/2 160 160 1/2 161 161 1/2 162 162 1/2 163 163 1/2 164 164 1/2 165 165 1/2 166 166 1/2 167 167 1/2 168 168 1/2 169 169 1/2 170 170 1/2 171 171 1/2 172 172 1/2 173 173 1/2 174 174 1/2 175 175 1/2 176 176 1/2 177 177 1/2 178 178 1/2 179 179 1/2 180 180 1/2 181 181 1/2 182 182 1/2 183 183 1/2 184 184 1/2 185 185 1/2 186 186 1/2 187 187 1/2 188 188 1/2 189 189 1/2 190 190 1/2 191 191 1/2 192 192 1/2 193 193 1/2 194 194 1/2 195 195 1/2 196 196 1/2 197 197 1/2 198 198 1/2 199 199 1/2 200 200 1/2 201 201 1/2 202 202 1/2 203 203 1/2 204 204 1/2 205 205 1/2 206 206 1/2 207 207 1/2 208 208 1/2 209 209 1/2 210 210 1/2 211 211 1/2 212 212 1/2 213 213 1/2 214 214 1/2 215 215 1/2 216 216 1/2 217 217 1/2 218 218 1/2 219 219 1/2 220 220 1/2 221 221 1/2 222 222 1/2 223 223 1/2 224 224 1/2 225 225 1/2 226 226 1/2 227 227 1/2 228 228 1/2 229 229 1/2 230 230 1/2 231 231 1/2 232 232 1/2 233 233 1/2 234 234 1/2 235 235 1/2 236 236 1/2 237 237 1/2 238 238 1/2 239 239 1/2 240 240 1/2 241 241 1/2 242 242 1/2 243 243 1/2 244 244 1/2 245 245 1/2 246 246 1/2 247 247 1/2 248 248 1/2 249 249 1/2 250 250 1/2 251 251 1/2 252 252 1/2 253 253 1/2 254 254 1/2 255 255 1/2 256 256 1/2 257 257 1/2 258 258 1/2 259 259 1/2 260 260 1/2 261 261 1/2 262 262 1/2 263 263 1/2 264 264 1/2 265 265 1/2 266 266 1/2 267 267 1/2 268 268 1/2 269 269 1/2 270 270 1/2 271 271 1/2 272 272 1/2 273 273 1/2 274 274 1/2 275 275 1/2 276 276 1/2 277 277 1/2 278 278 1/2 279 279 1/2 280 280 1/2 281 281 1/2 282 282 1/2 283 283 1/2 284 284 1/2 285 285 1/2 286 286 1/2 287 287 1/2 288 288 1/2 289 289 1/2 290 290 1/2 291 291 1/2 292 292 1/2 293 293 1/2 294 294 1/2 295 295 1/2 296 296 1/2 297 297 1/2 298 298 1/2 299 299 1/2 300 300 1/2 301 301 1/2 302 302 1/2 303 303 1/2 304 304 1/2 305 305 1/2 306 306 1/2 307 307 1/2 308 308 1/2 309 309 1/2 310 310 1/2 311 311 1/2 312 312 1/2 313 313 1/2 314 314 1/2 315 315 1/2 316 316 1/2 317 317 1/2 318 318 1/2 319 319 1/2 320 320 1/2 321 321 1/2 322 322 1/2 323 323 1/2 324 324 1/2 325 325 1/2 326 326 1/2 327 327 1/2 328 328 1/2 329 329 1/2 330 330 1/2 331 331 1/2 332 332 1/2 333 333 1/2 334 334 1/2 335 335 1/2 336 336 1/2 337 337 1/2 338 338 1/2 339 339 1/2 340 340 1/2 341 341 1/2 342 342 1/2 343 343 1/2 344 344 1/2 345 345 1/2 346 346 1/2 347 347 1/2 348 348 1/2 349 349 1/2 350 350 1/2 351 351 1/2 352 352 1/2 353 353 1/2 354 354 1/2 355 355 1/2 356 356 1/2 357 357 1/2 358 358 1/2 359 359 1/2 360 360 1/2 361 361 1/2 362 362 1/2 363 363 1/2 364 364 1/2 365 365 1/2 366 366 1/2 367 367 1/2 368 368 1/2 369 369 1/2 370 370 1/2 371 371 1/2 372 372 1/2 373 373 1/2 374 374 1/2 375 375 1/2 376 376 1/2 377 377 1/2 378 378 1/2 379 379 1/2 380 380 1/2 381 381 1/2 382 382 1/2 383 383 1/2 384 384 1/2 385 385 1/2 386 386 1/2 387 387 1/2 388 388 1/2 389 389 1/2 390 390 1/2 391 391 1/2 392 392 1/2 393 393 1/2 394 394 1/2 395 395 1/2 396 396 1/2 397 397 1/2 398 398 1/2 399 399 1/2 400 400 1/2 401 401 1/2 402 402 1/2 403 403 1/2 404 404 1/2 405 405 1/2 406 406 1/2 407 407 1/2 408 408 1/2 409 409 1/2 410 410 1/2 411 411 1/2 412 412 1/2 413 413 1/2 414 414 1/2 415 415 1/2 416 416 1/2 417 417 1/2 418 418 1/2 419 419 1/2 420 420 1/2 421 421 1/2 422 422 1/2 423 423 1/2 424 424 1/2 425 425 1/2 426 426 1/2 427 427 1/2 428 428 1/2 429 429 1/2 430 430 1/2 431 431 1/2 432 432 1/2 433 433 1/2 434 434 1/2 435 435 1/2 436 436 1/2 437 437 1/2 438 438 1/2 439 439 1/2 440 440 1/2 441 441 1/2 442 442 1/2 443 443 1/2 444 444 1/2 445 445 1/2 446 446 1/2 447 447 1/2 448 448 1/2 449 449 1/2 450 450 1/2 451 451 1/2 452 452 1/2 453 453 1/2 454 454 1/2 455 455 1/2 456 456 1/2 457 457 1/2 458 458 1/2 459 459 1/2 460 460 1/2 461 461 1/2 462 462 1/2 463 463 1/2 464 464 1/2 465 465 1/2 466 466 1/2 467 467 1/2 468 468 1/2 469 469 1/2 470 470 1/2 471 471 1/2 472 472 1/2 473 473 1/2 474 474 1/2 475 475 1/2 476 476 1/2 477 477 1/2 478 478 1/2 479 479 1/2 480 480 1/2 481 481 1/2 482 482 1/2 483 483 1/2 484 484 1/2 485 485 1/2 486 486 1/2 487 487 1/2 488 488 1/2 489 489 1/2 490 490 1/2 491 491 1/2 492 492 1/2 493 493 1/2 494 494 1/2 495 495 1/2 496 496 1/2 497 497 1/2 498 498 1/2 499 499 1/2 500 500 1/2 501 501 1/2 502 502 1/2 503 503 1/2 504 504 1/2 505 505 1/2 506 506 1/2 507 507 1/2 508 508 1/2 509 509 1/2 510 510 1/2 511 511 1/2 512 512 1/2 513 513 1/2 514 514 1/2 515 515 1/2 516 516 1/2 517 517 1/2 518 518 1/2 519 519 1/2 520 520 1/2 521 521 1/2 522 522 1/2 523 523 1/2 524 524 1/2 525 525 1/2 526 526 1/2 527 527 1/2 528 528 1/2 529 529 1/2 530 530 1/2 531 531 1/2 532 532 1/2 533 533 1/2 534 534 1/2 535 535 1/2 536 536 1/2 537 537 1/2 538 538 1/2 539 539 1/2 540 540 1/2 541 541 1/2 542 542 1/2 543 543 1/2 544 544 1/2 545 545 1/2 546 546 1/2 547 547 1/2 548 548 1/2 549 549 1/2 550 550 1/2 551 551 1/2 552 552 1/2 553 553 1/2 554 554 1/2 555 555 1/2 556 556 1/2 557 557 1/2 558 558 1/2 559 559 1/2 560 560 1/2 561 561 1/2 562 562 1/2 563 563 1/2 564 564 1/2 565 565 1/2 566 566 1/2 567 567 1/2 568 568 1/2 569 569 1/2 570 570 1/2 571 571 1/2 572 572 1/2 573 573 1/2 574 574 1/2 575 575 1/2 576 576 1/2 577 577 1/2 578 578 1/2 579 579 1/2 580 580 1/2 581 581 1/2 582 582 1/2 583 583 1/2 584 584 1/2 585 585 1/2 586 586 1/2 587 587 1/2 588 588 1/2 589 589 1/2 590 590 1/2 591 591 1/2 592 592 1/2 593 593 1/2 594 594 1/2 595 595 1/2 596 596 1/2 597 597 1/2 598 598 1/2 599 599 1/2 600 600 1/2 601 601 1/2 602 602 1/2 603 603 1/2 604 604 1/2 605 605 1/2 606 606 1/2 607 607 1/2 608 608 1/2 609 609 1/2 610 610 1/2 611 611 1/2 612 612 1/2 613 613 1/2 614 614 1/2 615 615 1/2 616 616 1/2 617 617 1/2 618 618 1/2 619 619 1/2 620 620 1/2 621 621 1/2 622 622 1/2 623 623 1/2 624 624 1/2 625 625 1/2 626 626 1/2 627 627 1/2 628 628 1/2 629 629 1/2 630 630 1/2 631 631 1/2 632 632 1/2 633 633 1/2 634 634 1/2 635 635 1/2 636 636 1/2 637 637 1/2 638 638 1/2 639 639 1/2 640 640 1/2 641 641 1/2 642 642 1/2 643 643 1/2 644 644 1/2 645 645 1/2 646 646 1/2 647 647 1/2 648 648 1/2 649 649 1/2 650 650 1/2 651 651 1/2 652 652 1/2 653 653 1/2 654 654 1/2 655 655 1/2 656 656 1/2 657 657 1/2 658 658 1/2 659 659 1/2 660 660 1/2 661 661 1/2 662 662 1/2 663 663 1/2 664 664 1/2 665 665 1/2 666 666 1/2 667 667 1/2 668 668 1/2 669 669 1/2 670 670 1/2 671 671 1/2 672 672 1/2 673 673 1/2 674 674 1/2 675 675 1/2 676 676 1/2 677 677 1/2 678 678 1/2 679 679 1/2 680 680 1/2 681 681 1/2 682 682 1/2 683 683 1/2 684 684 1/2 685 685 1/2 686 686 1/2 687 687 1/2 688 688 1/2 689 689 1/2 690 690 1/2 691 691 1/2 692 692 1/2 693 693 1/2 694 694 1/2 695 695 1/2 696 696 1/2 697 697 1/2 698 698 1/2 699 699 1/2 700 700 1/2 701 701 1/2 702 702 1/2 703 703 1/2 704 704 1/2 705 705 1/2 706 706 1/2 707 707 1/2 708 708 1/2 709 709 1/2 710 710 1/2 711 711 1/2 712 712 1/2 713 713 1/2 714 714 1/2 715 715 1/2 716 716 1/2 717 717 1/2 718 718 1/2 719 719 1/2 720 720 1/2 721 721 1/2 722 722 1/2 723 723 1/2 724 724 1/2 725 725 1/2 726 726 1/2 727 727 1/2 728 728 1/2 729 729 1/2 730 730 1/2 731 731 1/2 732 732 1/2 733 733 1/2 734 734 1/2 735 735 1/2 736 736 1/2 737 737 1/2 738 738 1/2 739 739 1/2 740 740 1/2 741 741 1/2 742 742 1/2 743 743 1/2 744 744 1/2 745 745 1/2 746 746 1/2 747 747 1/2 748 748 1/2 749 749 1/2 750 750 1/2 751 751 1/2 752 752 1/2 753 753 1/2 754 754 1/2 755 755 1/2 756 756 1/2 757 757 1/2 758 758 1/2 759 759 1/2 760 760 1/2 761 761 1/2 762 762 1/2 763 763 1/2 764 764 1/2 765 765 1/2 766 766 1/2 767 767 1/2 768 768 1/2 769 769 1/2 770 770 1/2 771 771 1/2 772 772 1/2 773 773 1/2 774 774 1/2 775 775 1/2 776 776 1/2 777 777 1/2 778 778 1/2 779 779 1/2 780 780 1/2 781 781 1/2 782 782 1/2 783 783 1/2 784 784 1/2 785 785 1/2 786 786 1/2 787 787 1/2 788 788 1/2 789 789 1/2 790 790 1/2 791 791 1/2 792 792 1/2 793 793 1/2 794 794 1/2 795 795 1/2 796 796 1/2 797 797 1/2 798 798 1/2 799 799 1/2 800 800 1/2 801 801 1/2 802 802 1/2 803 803 1/2 804 804 1/2 805 805 1/2 806 806 1/2 807 807 1/2 808 808 1/2 809 809 1/2 810 810 1/2 811 811 1/2 812 812 1/2 813 813 1/2 814 814 1/2 815 815 1/2 816 816 1/2 817 817 1/2 818 818 1/2 819 819 1/2 820 820 1/2 821 821 1/2 822 822 1/2 823 823 1/2 824	

For Net Bottom Prices see Page Adv. Iron Age, APRIL 15th.

BROUGHTON'S
BURGLAR-PROOF SASH LOCKS.
(Patented Oct. 7th, 1879.)
FOR NET BOTTOM PRICES SEE PAGE AD.
IN IRON AGE, APRIL 15th.



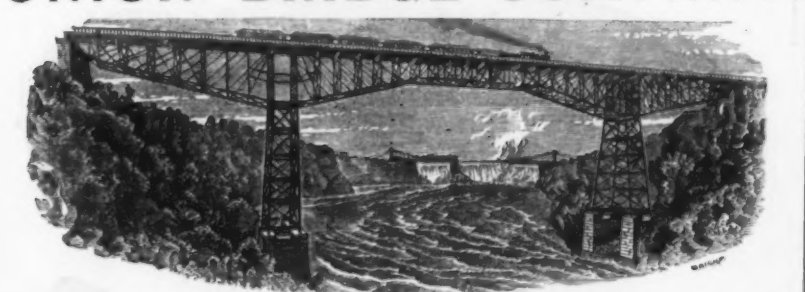
No. 210, Ornamental Iron, Iron Knob, fine finish, Etuscan Bronze..... \$0.60
No. 211, Ornamental Iron, Iron Knob, fine finish, Olympic Bronze..... .75
No. 212, Ornamental Iron, Iron Knob, fine finish, Pompei Bronze..... .85
No. 213, Ornamental Iron, Iron Knob, Nickel-plated..... 1.00
No. 214, Ornamental Iron, Iron Knob, Nickel-plated, Rich Old Gold Inlaid..... 1.50
No. 215, Ornamental Iron, Iron Knob, Nickel-plated, Pale Old Gold Inlaid..... 1.60
No. 216, Ornamental Iron, Iron Knob, Nickel-plated, Fire Old Gold Inlaid..... 1.75

No. 217, Ornamental Iron, Iron Knob, Nickel-plated, Crimson Old Gold Inlaid..... 1.85
No. 218, Ornamental Iron, Iron Knob, Nickel-plated, Blue Old Gold Inlaid..... 1.90
No. 219, Ornamental Iron, Iron Knob, Nickel-plated, Green Old Gold Inlaid..... 1.95
No. 220, Ornamental Iron, Iron Knob, Nickel-plated, Copper Old Gold Inlaid..... 2.00
No. 221, Ornamental Iron, Iron Knob, Nickel-plated, Lemon Old Gold Inlaid..... 2.05
No. 222, Ornamental Cast Brass, Polished and Lacquered..... 2.65
No. 223, Ornamental Cast Brass, Nickel-plated..... 3.60

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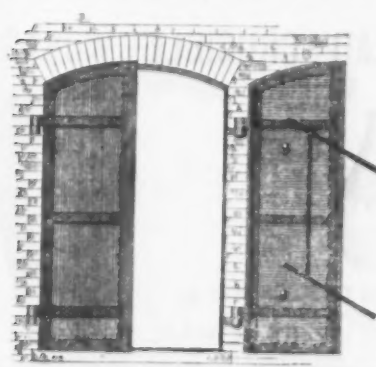
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W. R. McKILLIP, Grocer.

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Dear Sir: I am using one of your Lemon Drills and am very much pleased with it. I think it an article every housekeeper will appreciate when tried.
MRS. C. H. MORRISON.

DIRECTIONS.—Pare the end of lemon and drill out, working the Drill with rotating motion of the hand, holding lemon still. Gets more and better juice than any squeezer, extracting none of the poison from the seed. Is worth more than three of the best squeezers and sells for 10 cents. Wash as soon as used. Sent by mail on receipt of 15 cents in 2 cent stamps, or \$1.00 per dozen. Large discount to the trade. Ask your Wholesale Trade and Jobbers for them. Agents Wanted. They sell at sight. Sent by mail only on three sending 15 cents in stamps. All orders or communications should be addressed to the Patentee and Sole Manufacturer,
W. F. MOULTON, Burlington, Vt.
Please mention this paper.



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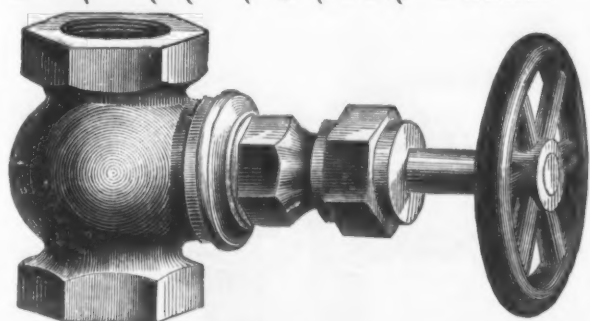
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Cartridges—		Common Hallers.....		dis 50&10
Rim Fire Military Cartridges.....		Faultless Hallers.....		dis 40
Con. Fire Cartridges, Pistol and Rifle.....		Hatchers.—C. F. Downe, new list.....		dis 40
Con. Fire Cartridges, Military and Sporting.....		Underhill.....		dis 40
Blank Cartridges, except 22 and 32 cal., an addi-		Hay Knives.—Lightning.....		\$18.00
tional 10% over above discounts.....		Hinges.—Strap and T (new list).....		dis 65
Blank Cartridges, 22 cal.....		Providence Plate.....		dis 6
Blank Cartridges, 32 cal.....		Wrought Screw Hook.....		dis 6
Front Shot Shells, Club, Rival and Climax.....		Hoes.—W. & C. Mfg. Co.'s.....		dis 60&10
R. B. Caps, Round Ball.....		Hooks and Sigs.—Brewer's (new list).....		dis 70
R. B. Caps, Conical Ball, Swaged.....		Horse Nails.....		No. 6 8 40
Primers.....		Cutnium Point.....		dis 20
Berdan Primers, all sizes, and R. L. Caps (for Sturte-		Bridgewater.....		dis 30
vant Shells).....		Knobs.....		dis 45
All other Primers, all sizes.....		Lanterns.—Tubular, No. 0.....		dis 75
Shells.....		Lawn Mowers.....		
Paper Shot Shells, 1st and 2d or 3d S. G. qual. dis 25&5		Continental.....		dis 5
Paper Shot Shells, 3d S. G. qual. dis 25&5		Dexter City.....		dis 5
Paper Shot Shells, Club, Rival, Climax.....		Philadelphia Keystone.....		dis 5
Paper Shot Shells, Star Brand.....		Lead—Sheet.....		dis 8
Brass Shot Shells, first quality.....		Pipe.....		dis 7
Brass Shot Shells, Club, Rival and Climax.....		Locks.—Norwalk.....		dis 45
Wade.....		Eagle Cabinet.....		dis 45
U. M. C. & W. R. A.—R. E., 11 up.....		Eagle Trunk.....		dis 15
U. M. C. & W. R. A.—R. E., 9x10.....		Mallory, Wheeler & Co.....		dis 6
U. M. C. & W. R. A.—R. E., 7x8.....		Manure Forks.—W. C. & Co.....		dis 60&10
U. M. C. & W. R. A.—P. E., 11 up.....		Matts.....		
U. M. C. & W. R. A.—P. E., 9x10.....		Long Cutter, \$18.50 per doz.....		dis 60
U. M. C. & W. R. A.—P. E., 7x8.....		Pick Cutter, \$16.00 per doz.....		dis 60
Anvil & Vise.....		Measuring Tapes.—Fady's.....		dis 20
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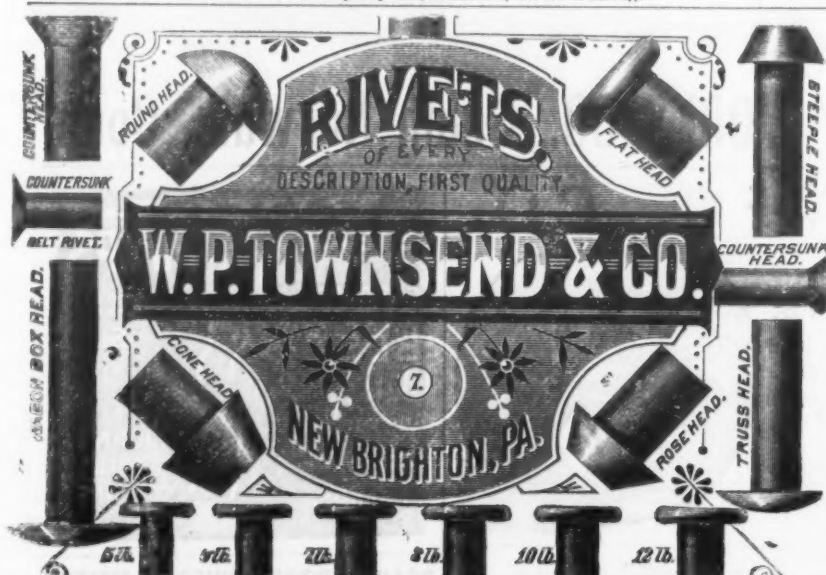
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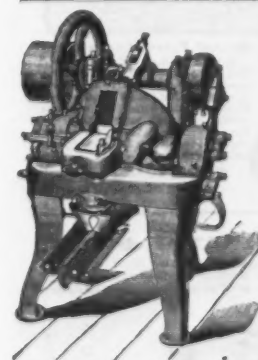
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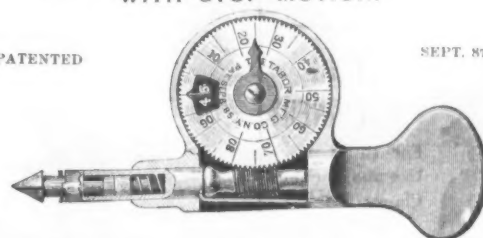


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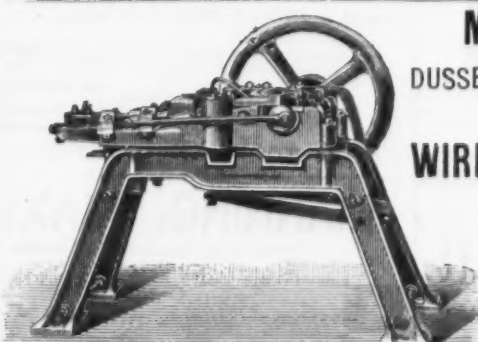
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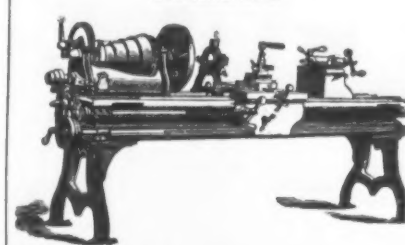
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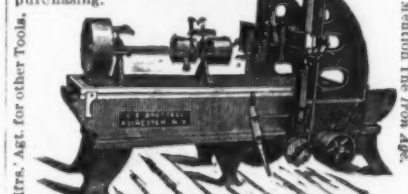
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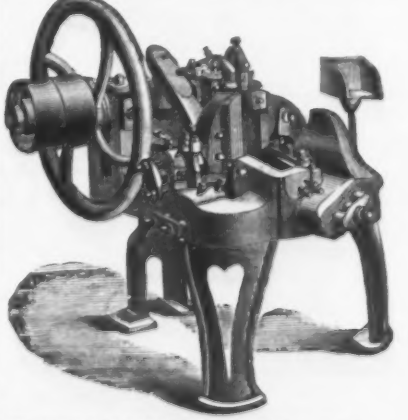
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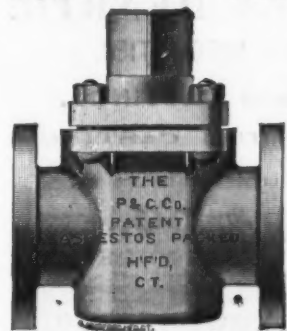
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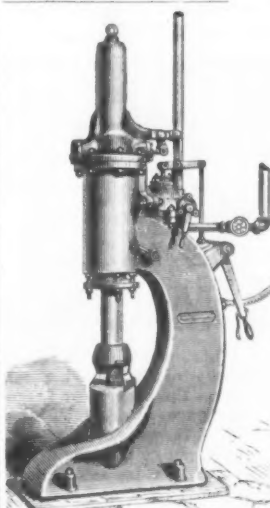
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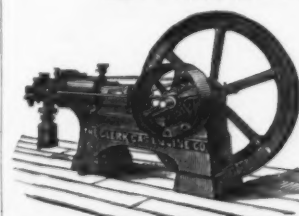
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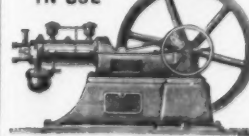
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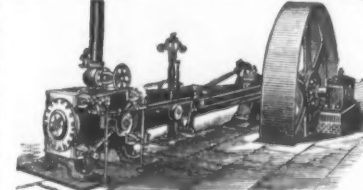
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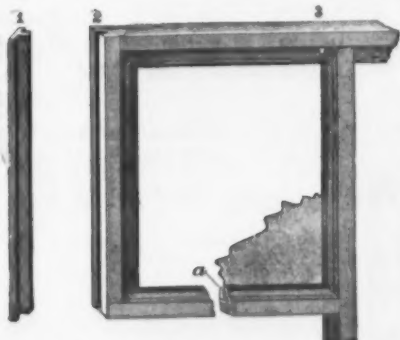
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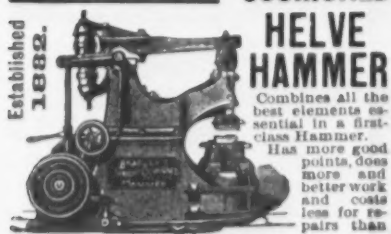
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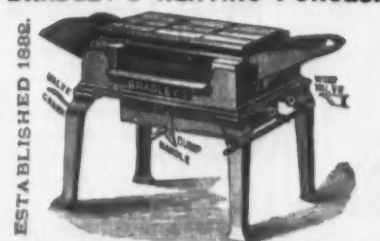
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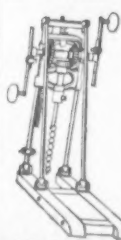
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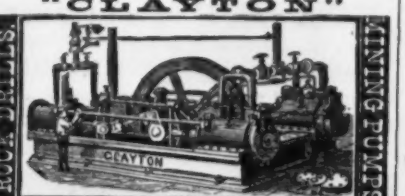
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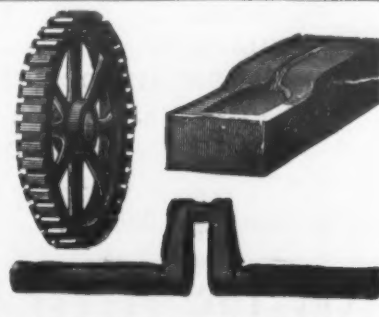
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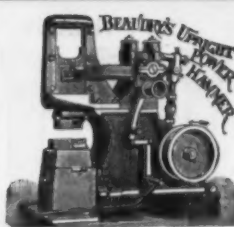
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